

THE  
DOMICILIARY CONDITION  
OF  
THE PEOPLE

BY  
SIR ROBERT HAWKINS, C.B., C.E.

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THE  
SOCIAL AND NATIONAL INFLUENCE  
OF THE  
DOMICILIARY CONDITION OF THE  
PEOPLE.

THREE ADDRESSES

BY

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## INTRODUCTORY REMARKS.

THE following Papers have been republished, not altogether because of their special value, but to further draw attention to the one great want of the time, namely, State attention to the defective condition of the Tenement and House-Accommodation of the working-classes.

The official published information on the defective condition of Tenements and Houses in towns and of Cottages in the country is extensive, as embodied in Blue Books and Official Reports; especially in the General Report on the Sanitary Condition of the Labouring Population of Great Britain, 1842, by Edwin Chadwick, C.B. If this Report alone had been fully studied, and the teachings therein set forth in Plans and Details for new Tenements, Houses, and Cottages, had been properly attended to and carried out, very much more progress in the right direction would have taken place than appears to have been made. The outcome of this valuable Report was no doubt the

Public Health Act, 1848, which has been amended by the Public Health Act, 1875.

The official reports also set forth most fully the details of the wretched dens inhabited by those outcasts who have no settled means of living by honest labour, who do not possess one farthing in the morning wherewith to purchase their first meal, and who at night may not have sufficient to pay for shelter in the lowest-class common lodging-house. How these outcasts, male and female, manage to live must be an unexplainable mystery even to themselves. During summer they tramp from race-course to race-course, sleeping under any cover or shelter available, living by any device practicable outside of honest work. In the winter, prisons, casual-wards, and town-slums, afford them precarious shelter.

No form of improved cottage fit for honest working-men will serve for these outcasts, and yet it will be one of the tasks of true Statesmanship to solve the problem what to do for them, or they will remain as a canker in the midst of the community. Improved common lodging-houses—regulated under the Act carried by Lord Shaftesbury—do afford shelter to the better



class of tramps, and improved night-refuges, similar to casual-wards, may probably be of fuller use; but still the task of dealing with the lowest class of tramps—who strive to avoid all police superintendence—will be painful, repulsive, and thankless—and yet they must be dealt with.

Improved Tenements and Houses for honest working men need not be very difficult to provide, but however provided, they must be maintained, or they will soon be degraded to the resemblance of the old slums. This is a painful feature to contemplate, but it is an evil which must be contended with. Wreckless destruction of house-property is not altogether confined to the families of working-men, but is found in classes above them, and this is one reason why house-property should have a margin in the rent to meet the cost of repairs.

Many of the evils of Overcrowding to be found in some towns has arisen from want of legal power and from municipal neglect; there has been no sufficient local control, no Building Act, no bye-laws to enable the authorities to stipulate as to sites, arrangements, sewerage, draining, paving, flagging, water-supply, and scavenging. All these powers are however now in force or may be put in force, and consequently the

evils of past neglect need not be repeated nor continued. But administration under local government is not in all cases disinterested. Medical officers, inspectors of smoke and of other nuisances, with local surveyors, should be enabled to act with honest independence.

Towns have been sadly crippled in their growth by the difficulty of acquiring land in the suburbs. This is a question eminently worthy of a Statesman's attention. In some cases land-owners were unwilling to sell, and in other cases short leases would alone be granted. But this Land question is far too complicated to be treated of here. The difficulties of obtaining land at reasonable prices have however caused many evils in overcrowded towns.

The questions are asked, when State interference is suggested: "Must the State build houses and lease or rent them at a loss? Must the State establish national workshops? Must the State in times of general distress feed the people?" These questions cannot be answered either "yes" or "no," in ordinary periods. The answer to be given must be preceded by exceptional circumstances, such as the Irish Famine, 1846-7, the Cotton Famine, 1863-4-5, and the terrible Famines in India. In these cases State aid

has been necessary and has been given; but the less of this form of aid the State can in future be called upon to give, the better it will be for all parties; as when the working and lower classes of nations begin to look to Governments for work and feeding, the end of safe government is near.

There is also another aspect to be contemplated, namely, that there never has been in past times nor ever will be in the future, a stable partnership of great wealth amongst the few and unregarded grinding poverty amongst the masses. How the balance shall be struck Statesmanship must find out, or a solution will sooner or later be attempted by Revolution. Great armies will not then be of avail to keep the peace, either at home or abroad, but will rather help on the inevitable catastrophe. The time is ripe for a full, fair, and free consideration of these vital Social questions, and there are fortunately many evidences that these questions will now be fully considered.

*Nov.*, 1883.

R. R.

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## HOUSE-ACCOMMODATION :

ITS SOCIAL BEARING, INDIVIDUALLY AND NATIONALLY.

[*Read before the Society of Arts, Wednesday, February 3rd, 1858,  
the Right Honourable the Earl of Shaftesbury, in the Chair.*]

THE paper now brought before the Society is intended to direct attention to houses as they have been, to houses as they are, and to houses as they ought to be. The house-accommodation of the masses will be principally considered, some defects will be pointed out, some resultant evils will be described, and certain suggestions for means of improvement will be made. The question of house-accommodation is, however, far too comprehensive to admit of full discussion in the time allotted to one evening, and, therefore, disappointment may be felt that some particular branch of the subject has not been dwelt upon.

House-accommodation and house-construction have received the attention of His Royal Highness the Prince Consort, and also the attention of many noblemen, gentlemen, and ladies, who have followed the good example set them. Model houses and improved cottages have been erected both by societies and by individuals, with beneficial results most encouraging; but to remedy all existing defects in houses of the poor in such manner is too much for isolated individual enterprise, and will tax the energies of a free government; the work must, however, be done.

I will now attempt to point out some of the existing evils, shewing how widespread these evils

have been and now are, and then briefly indicate a few practical remedies.

Improvement must be preceded by inspection, wherever neglect, filth, and disease exist.

Particular plans of improved cottages will neither be described nor recommended by me now, not because their appropriateness and advantages are not recognised and appreciated, but simply because there is not time to discuss the whole subject. I may be asked, "Why, then, open up the question?" My answer is, that in this great and free Christian country, knowledge must precede beneficial change, and to inculcate the necessary knowledge there must be "line-upon-line, precept-upon-precept."

Many good and able men have spoken and have written upon "the habitations of the poor," and many more good men must speak, must write, and must act, before the work will be even hopefully initiated. The question is one of health, of morals, of religion, and essentially one of national safety. If, as a nation, we will not work from higher and more Christian motives, our selfish fears may in time prevail. The life of a nation is in the masses.

A celebrated writer has said, if he might "write the songs of a people, he cared not who wrote their laws." I would say, "if I might house the people I care not who writes their songs, or who enacts laws." Good citizenship is not from without, but from within, and if men and women learn immorality from their birth, and in their homes, and are surrounded with vice as with the atmosphere, of what practical use can any secondary means prove? National schools, national reformatories—private schools and private reformatories—must alike fail. Gaols do not improve the morals of criminals, but notoriously render them worse. Gaols are actually looked upon by many criminals with favour, and not with dread. Cottages are not so clean, nor so airy, nor so warm, nor so healthy, nor so comfortable as prison-cells. I do not say "neglect the gaols," but



I do say "look to the cottages, to the birthplaces, the homes, the true schools and the only practical reformatories for the poor."

### HISTORIC SKETCH OF HOUSES.

The earliest form of protection for the human body from the effects of climate would most probably be caves, then tents of skins, and in time huts or other rude structures. The tent of the Arab is to this day as were the tents of the patriarchs. Types of house-construction may probably now be found in use in one part of the inhabited globe or another, which faithfully represent every contrivance for shelter either invented or appropriated by man, from the burrow of the bushman to the "solemn temples and gorgeous palaces."

Invention and progress seem however to be confined to a few of the many races of men, and progress, with permanence, has so far as we know been the lot of none. The much-vaunted Anglo-Saxon race is only on its trial—and if Lord Macaulay's prophecy should come true, we know its fate. Look abroad over the wide and fruitful regions of the earth, and we shall find retrogression in vast masses of the population, or superstitious forms stereotyped. As the Chinese were in ages past, so are they now. Throughout the East, generally, we find desolation or barbarism where civilization once reigned.

In these regions, from the earliest periods of history, and under every form of government, we also find that the masses of the people have been badly housed, and hence have occurred plagues, pestilences, misery, and premature deaths. The history of man, down to the present time, is one of neglect of sanitary laws, and consequently of retributive punishment. The Registrar-General points out weekly, quarterly, and annually, the national mortality, indicating the preventible excess, but, so far, to little practical parochial or municipal purpose, as compared with

the work required to be done. Ignorance is fenced round with selfishness: the desire is to protect property and pocket; the results are, ruin to property, to health, and to morals; the sacred name of freedom is invoked to perpetuate a state of things which breeds vice and engenders crime. An Englishman's house is said to be his castle. When Englishmen learn to keep their castles (that is, houses) so as not to destroy their own health, and render themselves, their wives, and their families, a burden to the community, they may be left alone; but a man cannot be allowed to keep at large a savage dog, or a mad bull, to worry, to tear, and to gore the public; why then should any man be allowed to generate and let loose typhus, small-pox, and other analogous diseases, to disfigure and to destroy? Lord Shaftesbury, by his Common Lodging-Houses Act, has given the means to prevent disease and to diminish immorality in these places, and wherever the Act is put in force, the beneficial results are acknowledged alike by landlord and by tenant. Let there be such a power of inspection, wherever contagious diseases break out, whether the house be that of a rich man or that of a poor man, and the results will be a benefit to all.

Several towns have had public and private works of sewerage and drainage carried out with most marked beneficial results; but back streets, courts, and alleys remain neglected, room-tenements and cottages (not common lodging-houses) remain overcrowded, unventilated, filthy, and breeders of fever. The parish authorities can only relieve distress brought about by preventible disease; they cannot or they do not remove the causes of the disease.

#### HOUSES AS THEY HAVE BEEN, AND HOUSES AS THEY ARE.

Central Asia—the birth-place of truth and of myth, the cradle of history, the land of contrasts—presents us with the oldest type of human dwell-

ling; and what do we find but, side by side, wretched hovels and the most luxurious palaces? In the hovels we find the Arab Egyptian, the "Fellah," the "Ryot" of Hindostan, and the swarming masses of China, who all fare badly. A hut of mud, a roof of thatch, a floor of filth, hovel and clothing abounding with parasitical vermin, where skin diseases, ophthalmia, along with other analagous complaints, prevail. From generation to generation there has been and there continues to be the greatest amount of misery to the greatest numbers. The tropical sun shines down upon filth, upon squalor, and upon disease. The vulture, the stork, and the dog scavenge the streets and suburbs as of old; and at a glance you may see that the existing dog of an Eastern city is a lineal descendant of those dogs which licked the blood of Ahab and ate the carcase of Jezebel beneath the walls of Jezreel. Plague ever broods over these sites, and cholera sows its subtle but death-producing seeds in the face of the sun, to be wafted by the atmosphere, to kill wherever there is degraded man living amidst filth, foul-air, and wallowing in sin.

The Russian serf is miserably lodged; the habitations are of rude materials, are primitive in form, and wretched in accommodation. Over the continent of Europe, generally, the poor are lodged in mere hovels, with defective means of sunlight, with defective means of ventilation, and filthy alike internally and externally. Examine the tenements of Germany, of Denmark, of France, of Italy, of Portugal, of Spain, and of the other kingdoms, and you will see the appropriate residences of ignorance and superstition; the fitting birth-places of wild turmoil and anarchial revolution.

But as Englishmen let us look nearer home,—let us blush and sorrow over the mud-hovel of Ireland, the "boothie" of Scotland, the country cottage, and the room-tenement of England. I have seen these places, and have witnessed sights I cannot describe,

and human misery the pen fails in power to depict. The story of this source of national deterioration has however been told recently by many able men, as may be found in despised blue books and in literature not popular.

If we look to our mediæval history we find that our cities, towns, and villages, for the most part, were composed of hovels with mud walls and with thatched roofs. Mud floors were covered with rushes or straw, which remained until the compost was rotten to corruption. Houses were without order or regularity. Streets, in cities and in towns, were narrow, dark, and tortuous; the subsoil was without sewers and drains; the streets were without pavements or lights. Dog-berries watched but did not ward; bravoës stabbed, burglars plundered, and nimbler thieves "cut purses." The only remedy known to the magistrates consisted in loading gibbets and in "stringing sturdy rogues to the gallows apace."

Time rolls on, and "merry England" grows into the improved state depicted in Swift's "City Shower." Parts of cities and towns had then pavements and surface-gutters, but few sewers, and these rude. There are now pavements, sewers, cleansing, lighting, and watching more generally; but many a poor man's cottage and many a room-tenement receive no adequate benefit. There is scarcely a city, town, or village in Great Britain in which there are not to be found some houses and some rooms into which the sun never shines, into which a breath of fresh air seldom blows. There are courts closed all round; alleys not two yards wide; rows of cottages, back to back; rooms without window or flue; cellars with ceilings below the level of the ground; attics in which a child cannot stand upright; and inhabited human dens too foul for wild beasts' lairs.

There are many reasons for the utterly degraded state of this portion of our poor. Centuries of neglect and of seasoning have blunted the natural senses to the taint of foul air; as, most frequently, the only



industry shown is to block out fresh air to secure heat; and when we find thousands of men, women, and children in our towns, barely covered by a few filthy rags, inhabiting rooms without furniture, lying on rags or on tainted straw, with no adequate food, and no certainty of a second meal except by begging or by stealing, we should judge their ignorance of sanitary laws lightly, and deal gently with their transgressions, as most of these poor creatures never had a chance given to them of knowing better or of being better; they cannot build houses, they cannot furnish a single room, however small; they cannot understand the laws of nature; they cannot appreciate oppressive sanitary rules when arbitrarily enforced; they are hungry, and wish to eat; they shiver in the cold, and wish for warmth; they are exposed to the bitter elements of a severe and varying climate, and they wish for shelter. A living body is warmer than a naked wall or bare floor, and hence overcrowding is considered a desirable thing. They feel and appreciate the warmth, but do not see the subtle poison; and in fact the carbonic acid deadens the senses and induces oblivious repose.

The reports drawn up by the Inspectors of the General Board of Health and others detail case upon case of defective houses and of improper room-accommodation. I could add proof upon proof, from personal inspection, of the discomforts, sicknesses, and miseries endured by the poor who reside in cellars—damp, fœtid, and dark at noonday; or who huddle together in room-tenements which are without furniture, the floors rotten, the walls blackened with filth, the ceilings hung with webs of spiders, and out of which rooms fresh air is as much as is practicable excluded. There are the rubble walls of the north, the porous bricks of the midland counties, the “cob” walls of Devonshire, and the rotten timber and shingle of some of our seaports. Out of these places proceed fevers—upon them settles cholera. Into them goes the parish money, as the

relieving officer and the parish surgeon cannot long be absent. The rent is paid by the parish, and not unfrequently more than the value is so expended. There are room-spaces of the most wretched class which annually cost a parish more to maintain than any equal area of floor-space in Windsor or in Buckingham Palaces could be valued at.

The Registrar-General has stated that the tendencies of modern civilisation in this country are to mass men into towns. In 1841, the population in 117 districts comprising the chief towns was 6,612,958 souls. In 1851, in the same districts, the number was 7,795,882, being an increase of 1,182,924 in ten years, or about 18 per cent. There is a corresponding increase in the rates of mortality, although in some cities and towns there have been many sanitary improvements.

As towns increase, there is an engulfing or lowering of whole streets and of entire districts of houses built originally for the merchant and superior tradesman. Examine some of our great seaports and inland manufacturing towns, and it will be found that streets of houses originally erected for the merchant princes are now in partial ruin; from having been the abodes of those possessing wealth, they are now the abodes of the improvident, of the vagrant, of the vicious, and of the unfortunate. The quaint carving on the stone-work looks out of place, the walls are half in ruins, the gables are shattered, and foul weather-stains of damp blotch the surface. Within, matters are even worse: the rooms are now divided and subdivided on every floor; the staircase is darkened, its massive hand-rail and carved balusters are crippled and broken, the once firm stairs are now rickety and dangerous; the stucco-finished plastering is blackened and in holes, the dusty and rotten laths being in many places bare; the landing-windows, when the space is open, have neither frame nor glass, so that the rain drives in right and left; make-shift doors lead into



rooms divided into small spaces let off as separate tenements. The narrow street betwixt the houses is further contracted by rude-looking poles rigged out of windows on either side, storey above storey, on which clothes are hung to dry; thus, externally, a free flow of air is impeded, and an atmosphere, usually very damp, is made more so.

In the same street, houses may be found which were erected in Queen Elizabeth's reign, with others of more modern date; the old walls are of hewn stone, of bricks, of timber-framing, of limestone rubble, or of other material. Some have been plastered, and others have been covered with slates; some have plain vertical fronts, and others project at each storey. Out of these streets covered passages lead into still narrower, dirtier, and more crowded courts. In many instances the ground rises abruptly, and slippery half-worn steps lead to houses more ruinous and more crowded than those fronting the streets. One privy serves for a whole court, and this is usually filthy; the cesspool full, overflowing; the fœtid refuse stagnant over the surface. An external stand-pipe—the water on only for one hour in twenty-four—supplies water to an entire court with many tenants; tubs, mugs, pots, pans, and troughs, being placed in yards, on stair-landings, or in the filthy rooms, to absorb all the deleterious gases of the places. Within, the furniture accords with the premises: it is old, rotten, broken and ruinous. One room serves for a family of father, mother, and children—not unfrequently grown-up sons and daughters. Dogs and fowl inhabit the same small apartment, and in some instances ten human beings. In gaol each criminal has at the least one thousand cubic feet of fresh air secured, and the air in this space is regularly, evenly, and many times changed during each day. The inhabitants of room-tenements, of country cottages, of Scotch boothies, and of similar places, have frequently not one hundred cubic feet of air-space, and this air is never

changed, but by the natural law of diffusion of gases, the deleterious carbonic and sulphuric acids are allowed to perform their fatal work.

There are many defects in old and in modern villa and suburban houses, such as improper site for detached houses, in the country or in the suburbs of towns. The site is a swamp, an undrained hill-side, or even a hill-top. The sewerage and drainage is defective; the plan confused; the rooms too low; doors, windows, and fire-places improperly placed; and means for ventilation may have been entirely neglected. The pump and the cesspool may communicate, and pipes, and gutters, and cisterns of lead, may add that deleterious metal, in solution, to the water used for domestic consumption. There are few country or suburban houses, even of the better class, entirely free from some one or more of these defects—no, not even large mansions.

Having glanced at houses as they are in courts, in lanes, in alleys, and in the back slums of towns, and at some of the defects of those in their suburbs, we will now look at some houses as they are in the country throughout Great Britain.

### COTTAGES.

Look at these structures called cottages. They are mere hovels of mud; or of "wattle-and-daub;" or of rubble-stone set in mud; or of rude timber frames filled in with mud or with other material. The timber is rotten; the mud damp in wet weather, and dusty in dry weather. Look at the site: probably a hole; not unfrequently a swamp several feet below the adjoining road, the slope being towards the door. If on an elevation, the ground is unformed, rugged, abrupt, uneven, and neglected. Many of these hovels are only one storey in height, the side-walls are very low—from three to six feet up to the square—few are vertical, and some are supported by buttresses

or by props. Many are half-buried against a hill side, or against a bank which is wet.

Then the roof. This may be of thatch of heather or of straw; or it may be formed of turf, of sods, or of shingle. If of thatch, the material is rotten with age and green with fungoid vegetation; if of shingle, the timber is decayed. Doors and windows match the structures, and the floor is native mud—the space enclosed being common to bipeds and to quadrupeds alike. The floor is not only very dirty, but the walls, roof, and furniture are the colour of grimy dirt. Amongst the rafters, spiders and other insects abound. Outside, refuse is stored in some hollow where liquid permanently rests, so as to keep up evaporation and an evolution of gases highly injurious to human life, and if this refuse does not actually surround the hovel, it is frequently so situated that the prevailing winds shall drive the gases of decomposition into and through the habitation. The arrangements for disease, misery, and premature death are ample, adequate, and complete. The hovel is crowded by males and by females of all ages, without means of separation, so that the arrangements for sin and misery are also complete; morality is consequently at a low ebb. How can it be otherwise? Look at the country in which these hovels are situate. There may be the grand old mountains of Wales, fragrant with heather and wild flowers; there may be the glorious lake scenery of Cumberland; or there may be the graceful undulations of the midland counties, agriculturally rich beyond the romance of fable,—trees, corn-land, and grass-land blending harmoniously; or we may look over the wolds of the chalk and oolitic district, open in broad rounds and smooth valleys, dry and comparatively bare of trees, but, nevertheless, yielding rich herbage and fine crops.

Such hovels as I have faintly attempted to depict may be found in landscapes such as I have most imperfectly attempted to describe, but the houses are neither ornamental nor useful, although artists persist

in designating them picturesque. There are not only agricultural hovels, but there are sea-side fishermen's hovels, and out-of-the-way miners' hovels. They are, however, all of one type, and are too frequently nests of filth, of foul air, of sickness, of immorality, of human degradation, and of human sorrow. The parish doctor knows the inhabitants—they consume his time and his physic. The relieving officer knows them—they empty the parish pocket. The village constable knows them—they are his most turbulent customers. The gamekeeper knows them, as frequently they are desperate poachers. The magistrates know them—they commit petty thefts, and produce bastardy cases. The minister of religion knows them, as most assuredly amongst these people his principal work lies. The charitable know them—as ladies, delicate and good, visit, sympathise, and relieve them.

“Hovels and their inhabitants as they are,” such as I have tried to describe them, are known and they are unknown. They are, as above stated, known to artists, to parish surgeons, to constables, to gamekeepers, to some clergymen, and to benevolent ladies; but, contradictory as it may seem, they are for the most part unknown to parish guardians, to town-councillors, to country squires who are landowners, to imperial legislators, and to the general public. By some landowners their existence is considered to be an incumbrance, as every attempt is made to clear the estate from cottages. Cattle have value for such persons, but not poor human beings!

#### SCOTCH HIGHLAND AND ISLAND BOOTHIES.

The cottage boothie or hut in Scotland is a barbarous shelter. Many of those in the highlands and islands are mere hovels, rough in the materials used, and rude in the form of construction. The side-walls and gables are of dry rubble-stone, peat, or mud; the covering is thatch, mud, or sod, often a jumble



of material, plastered, piled, weighted, or tied on. The door is low; a mere hole serves for window, and a hole in the roof lets out a portion of the peat-fire smoke. There is no flue, and, consequently, when the fire smokes there is a general distribution of smoke with the heat, so that a philosopher may study the law of "diffusion of gases" visibly. Smoke not only rises through the hole specially left for its escape, but pours out of door, window, and also out of every crack and cranny in roof and side-wall. A stranger might easily imagine that the boothie was on fire, or mistake it for some charcoal-burning apparatus or kiln. The inside of one of these boothies is a curiosity. There is an attempt at division, and beds are made up in recesses of the smallest dimensions against the damp walls or bank, and closed in by the aid of hurdles made of heather or some equally rude contrivance. If there are ceiling-joists, a loft is made in the roof, to be reached not by stairs, but by a ladder; and this may be a general store or a bed-room. Most frequently the natural earth—be it rock, mud, or peat—forms the floor, full of holes, worn and uneven. Pavements may be found of rude flags or pebbles, or a mixture of both. Many boothies give shelter to cattle and other animals which man retains for his use—quadrupeds and bipeds—such as dogs, pigs, ponies, ducks, and fowls. They may enter all by one door, or there may be a separate entrance under one roof. Inside and outside these places there is dirt and neglect. The very spirit of thrift could not in fact keep such places clean. Smoke is as the breath of life to the residents, damp and dirt an institution. Weak eyes, sore throats, and fevers are common.\*

\* Up to the early part of Elizabeth's reign, cottages in England generally consisted of a single room, and chimneys were unknown in such dwellings. Up to the end of the 13th century, castles (or baronial dwellings) were literally fortified places, in which the convenience of habitation was sacrificed to purposes of defence. It was not till the 15th century that barons resigned the security and gloom of their castles for the comparatively greater comfort and convenience of castellated houses.

We censure the poor for their indulgences in drink; but what says that close observer of human nature, Sir Walter Scott. Listen to the antiquary and the village fish-wife, after the bargaining for the fluke and the eock-paddle.

Monkbarns says:—

“Half-a-crown, then, Maggie, and a dram.”

“A weel, your honour maun hae’t your ain gate, nae doubt, but a dram’s worth siller now, the distilleries is no working.”

“And I hope they’ll never work again in my time,” said Oldbuck.

“Ay, ay,—it’s easy for your honour, and the like o’ you gentle-folks, to say sae, that hae stouth and routh, and fire and fending, and meat and claith, and sit dry and canny by the fire-side,—but an ye wanted fire, and meat, and dry claise, and were decing o’ cauld, and had a sair heart, whilk is worst ava’, wi jist tippence in your pouch, wadna ye be glad to buy a dram wi’t, to be cilding and claise, and a supper and heart’s ease into the bargain, till the morn’s morning?”

Charity is inculcated in the Scriptures, and it must not be denied that charity is necessary to Christianity; but there are many forms of false charity, and some of these forms are demoralising. It is not true charity which leaves a labourer and his family in some wretched cottage or hovel to contract and to endure fever, and then to relieve him with wine, jellies, and similar delicacies. It is not true charity to allow the poor man’s home to be all discomfort, so that the ale-house leads him from bad to worse, until a gaol receives him from the esquire’s sentence, and then for the esquire’s lady and daughters to carry or to send relief to a broken-hearted mother and starving family. Soup-kitchens, charity-bazaars, money-clubs, clothes-clubs, dispensaries, and personal visits to distribute money or food, are not to be denounced; but they should all be secondary, and not primary; the duty of the rich



is to help a poor man to help himself. Firstly, by providing comfortable and healthy homes ; and, secondly, by living such a life in the village as shall be a good example : a clean, well-ventilated, and well-drained cottage, with good water and a small garden, at a moderate rent, should be provided for all. A case of fever should lead to an immediate inspection and to immediate sanitary improvement ; other forms of relief may then be consistently offered. It is a mockery, if not worse, to allow a man to inhale cottage-bred poison, and then to offer him sympathy in the form of intoxicating drinks and delicate food which do not cure fevers, but fresh air and wholesome water, with plain food well cooked.

Promote means of health by providing wholesome dwellings, promote means of industry, promote habits of forethought and habits of economy ; then add to this relief to the aged, and especially the afflicted, that blessings may rest on the giver and on the receiver.

Many richly endowed charities are by mismanagement made a perpetual curse ; and many so-called charitable people sow the means of vice broadcast. Schools, churches, union-workhouses and gaols, will neither cure nor even reduce the evil ; there must be the means of health and comfort, with a chance of virtue, in every British home, before men, women and children can be Christians.

### VENTILATION OF HOUSES.

Many volumes have been published on the subject of ventilation, and many patents have been granted for apparatus to effect ventilation ; and yet, one of the evils most common, both in public and in private buildings, is defective ventilation. How is this ? The nature and properties of the atmosphere have been accurately described over and over again, and correct means of ventilation are lucidly set forth by more than one author, — from Count Rumford to Dr. Arnott ; but somehow or other

the right knowledge does not get into the right heads,—hence all the neglect or blundering, all the mischief, and all the consequent misery and inconvenience. With the wheat of knowledge there is a vast amount of the chaff of ignorance and of advertising quackery. Few architects make ventilation a special study, and they consequently neglect alike both wheat and chaff; ventilation has not been “in the bond;” they design and build a house, having doors, windows, fireplaces and chimneys; but there is no warranty given that the rooms shall have full and free means of ventilation, independently of doors, windows, and ordinary chimney-places, or even that all the flues shall draw. Will it be improper in time to come to ask for such warranty? All rooms ought to be ventilated,—all chimneys ought to draw. The task may be difficult in some cases, but it is not an impossible one, as smoke obeys a simple law of nature under all circumstances and on all occasions; it never comes down when it ought to go up, without good and sufficient reason; if there is a fault, it is in the room and flue, or in the architect, and not in the smoke.

It may be pardonable to attempt once more in a crude manner that which has been so often and so well done by some greater men, viz., to explain some of the properties of the atmosphere.

Air is a substance highly elastic, but under equal temperatures, its bulk and gravity are tolerably permanent.

Heat expands air, causing it to occupy more space, and hence heated air is lighter in proportion to the heat imparted to it.

Warm air, being lighter, rises into and through colder air; and cold air, being heavier, descends into and through warm air; that is, the warm air in a room and chimney rises into colder air outside, and there is a tendency in the cold air to descend into the warmer air of the room, even down the chimney, if the balance of the draft is not in favour of an

upward current. When small rooms having air-tight doors and windows, contain air several degrees of heat above the external atmosphere, this colder and heavier external atmosphere presses in down the chimney to restore the balance—hence the smoky rooms in winter.

To maintain combustion a regular feed of air is necessary to counterbalance the abstraction of air by the fire, and the necessity of chimney-flues to remove the heated products of combustion.

All rooms are reservoirs of air; they contain so many cubic feet, according to their dimensions. A room 10 feet long, 10 feet broad, and 10 feet in height, contains 1,000 cubic feet of air, at all temperatures, neither more nor less. But, as air is expansive and is expanded by heat, 900 cubic feet at a low temperature may be heated until they are increased in bulk to 1,000 cubic feet at a higher temperature. In this case, as there is one-tenth less of substance, there is also about one-tenth less of weight, and one-tenth less of the chief ingredient to nourish life. The warm air is one-tenth lighter, but in each case the room is full of air.

For the sake of illustration, we will compare the room full of air to a cistern full of water (though water is practically non-elastic). Then, to maintain either a room full of air, or a cistern full of water, if provision is made for drawing out (or abstracting like a chimney-flue), provision must be made for letting in. If doors and windows fit tight, and there is no other means of admission, it will be practically impossible to abstract air by the fire and chimney-flue from a room for any length of time without having a down-draft, the operation could not go on for an instant, but by reason of the elasticity of the atmosphere; but few rooms have doors and windows, walls, floor, and ceiling perfectly air-tight, and hence a fire is burned at the expense of cold drafts, wherever external air, in winter, can find entrance. This is generally under

the door, through the skirting and floor, and so along to the fire-place. Who does not suffer from cold feet in winter, especially during frosty weather?

Small rooms, having less air to pull upon expansively, frequently smoke by puffing down-drafts in the chimney. The fire forces air up the flue, until the air is too highly rarefied in the room, and there is practically a partial vacuum; cold air then descends the flue to restore the balance, forcing some of the heated air and smoke with it. Large rooms, as a rule, having more air-space, are more easily warmed, and are consequently freer from draughts than small rooms.

There is one form of evil connected with houses, namely, the admission of foul gases from sewers, drains, or cesspools, which being unseen may remain unrecognised, although much sickness and many premature deaths may occur in consequence. At all times when the internal temperature of any house is higher than the external air, there is an active exhaustion caused by the fires up the chimney, and there is a drawing or pumping power within the house, and sewer and cesspool-gases are drawn in from every crack and from every cranny. The mischief of such a state of things is very great. In forming sewers and drains, this contingency should never be lost sight of. Defective sewer and drain connections are a source of mischief, both winter and summer, as in winter the foul gases are drawn in, and in summer sewer-gases (sulphuretted hydrogen) and others, which are lighter than common air, flow in. Many persons think that houses situate on a hill, or having a rapid fall for the drains and sewers, must necessarily be easily drained; this is a mistake if the drains enter the house—which a drain should never do—and there must be special and ample provisions for external ventilation from the sewers and drains, or the gases from lower levels will flow up and into such houses. Water, by reason of



its weight, which is greater than atmospheric air, flows down hill with velocity proportionate to the slope and to the friction; sewer-gases, by reason of their gravity, which is less than atmospheric air, flow up-hill with velocity also proportionate to the slope and to the friction. It is therefore of the utmost importance that these facts should be remembered.

There is the law of "diffusion," by which gases disperse throughout atmospheric air. If this law were annihilated, the present order of animal creation must cease to exist. It is this diffusion of gases which renders a hut, boothie, cabin, room, common lodging-house, or modern drawing-room, tolerable during excessive crowding. The poor over-crowd their wretched apartments partly from ignorance, but more from stern necessity. The wealthy crowd a modern drawing-room partly from ignorance, but more because it is fashionable. The mischief is alike injurious in both cases. At a dinner table we have our plates and knives and forks changed, and use separate glasses for purposes of drinking; but in an unventilated and a crowded drawing-room, or in a crowded ball-room, we breathe and re-breathe the waste products of our own and of each other's lungs, vitiating and re-using the polluted air in common—a process far more injurious to health than using dirty plates and dirty glasses in common. Ventilation, free and abundant, should in all cases be provided for; but no amount of ventilation will do away with the evils of overcrowding. An overcrowded hovel or an overcrowded drawing-room is an evil, and would still be an evil if even their ceilings and their roofs could be removed.

#### EXTRACTS FROM BOARD OF HEALTH REPORTS.

The following extracts from Reports by the Inspectors of the General Board of Health will give some idea of the defective sanitary condition of the dwellings of the poor in the towns named.

## WHITEHAVEN.

The supplement to the report on Whitehaven, dated 1849, contains tables of the "room-tenements" and "cellar-tenements" within the district, and states that "the buildings are in a ruinous condition; the staircases are of wood, frequently dark, confined, and rotten or out of repair. Where the beds are described as 'old and dirty,' they are upon bed-stocks, but very few of the occupants have anything to cover themselves with but a bundle of old rags. Those beds, named 'rags and straw,' are on the floor without bed-stocks, and without proper bedding to cover the occupants with; the bed-clothing, if any, a bundle of rags. Many of the rooms are swarming with vermin; disease and fever prevail throughout."

Out of 315 room-tenements, inhabited by 1,369 persons, there are 256 described as being without means of ventilation. The beds in 83 of these tenements are composed of "rags and straw," and nearly the whole of those in the remaining tenements come under the headings of "dirty," or "old and dirty."

Out of 191 cellar-tenements occupied by 716 persons not less than 177 were stated to have no means of ventilation. "They are damp and dirty to a degree not to be described; a heap of dirty straw or rubbish constitutes the only form of bed in most cases, and this is laid on the damp floor in one corner. The confined smell and fœtid atmosphere are most offensive, and almost suffocating to any person entering. They have no privies, nor convenience for ashes, but the inhabitants get rid of their refuse as they best can, most frequently immediately in front of their door." It may be added that 12,000 of the inhabitants, or two-thirds of the entire population, were, at the date of the report (1849), without any privy accommodation.



## GATESHEAD.

In the report on Gateshead (1849), speaking of the dwellings of the poor, the Inspector (myself) says,—  
 “Neither plain nor written description can adequately convey to the mind the true state and condition of these room-tenements, or of the inhabitants occupying them. The subsoil on the sloping side of the hill is damp and most foul ; the brickwork of the buildings is ruinous, the timber rotten, and an appearance of general decay pervades the whole district. The buildings, originally erected as residences of a superior description, have single rooms let off as tenements, which are crowded with men, women, and children ; the walls are discoloured with age, damp, and rot ; the windows are broken—old rags, straw, and boards, occupying the place of glass, so that means of light and ventilation are alike absent. There are no sewers nor drains, neither is there any proper (privy) accommodation ; solid filth encumbers the surface ; liquid refuse saturates the subsoil, and is drawn by capillary attraction through the porous bricks up into the walls ; personal cleanliness or a healthy atmosphere is impossible.”

## DOVER.

In the Inspector's report on Dover (1848), the following evidence of the relieving officer of the district is given :—

“The largest proportion of out-relief is distributed in the worst portions of the district and is caused by fever, small-pox, or other similar complaints, such being very prevalent in these localities ; caused I have no doubt to a very great extent by the closeness of the buildings and their filthy state, from want of proper drains and other sanitary regulations.”

From the experience of upwards of ten years' intimate connection with the poorer classes, the relieving officer stated : “I have not the slightest

hesitation in affirming that there is a most decided direct connection betwixt confined districts, bad sanitary arrangements, poverty and vice. In the worst districts the moral state of the inhabitants is most deplorable,—as the youth from these places grow to manhood they become habitual thieves or paupers; brought up to no regular employment, grossly ignorant and reckless, their time is spent between the gaol and the union workhouse. I can only say that if the Government wishes to prevent the increase of a most debased and vicious population, they will take measures, if not to sweep away these nests of vice and disease already built, at any rate to prevent similar places from being erected in the future.”

The Rev. T. W. Darwell, curate of St. James's parish, Dover, says—

“My own observations and experience in visiting among the poor tend most decidedly to confirm the evidence that better sanitary regulations would tend very materially to improve the habits of the people. The poor man, when fatigued, cannot be expected to remain in his room or house, if his wearied senses are to be oppressed by noisome stenches and disgusting objects. He naturally seeks the beer-shop as a refuge, and his wife and family are left to seek relief under such circumstances as they may. Thus the domestic bond is loosened, if not severed; the man ceases to regard his family and they cease to respect him; and so a generation of reckless and unprincipled persons is by these means turned out upon society.”

The Rev. J. Puckle, Incumbent of St. Mary's, Dover, in a letter addressed to the superintending inspector in 1848, says—

“From a ministerial experience of 13 years, I am perfectly satisfied of the close connection subsisting between the sanitary and the moral condition of our poorer classes. I have found, without any exception, the worst demoralization in the worst constituted dwellings and neighbourhoods, the one

being traceable from the other, directly, as effect from cause. To what extent we may ever succeed in raising the moral tone of our poor people's habits of life, time only can show; but I affirm, in conscience, that to raise them while they live in such places, and under such circumstances, is impossible."

#### FALMOUTH.

The relieving officer of the Falmouth district in his evidence given before myself, the Superintending Inspector, says :—

"I pay in out-door relief from £8 to £9 per week in the district; in the town of Falmouth about £5 a-week. Have seen fever in the places I visit. Pay most relief in the worst places. Sometimes continue payment five or six weeks to one family, and as much as seven or eight shillings a-week. Much of this cost might have been saved if fever could have been prevented. See much misery. The people do not complain so much as we complain of the nuisances. Had extra relief to pay for cholera in 1848 and 1849 and pay to this day (1854) to some of the families made paupers by the cholera."

The medical officer to the Falmouth Union states :—

"Fever prevails in most of the courts. It is invariably found with dirt. Where there are defective ventilation and bad drainage, there we get fever. Many of the bed-room windows will not open. The rooms are about twelve feet by ten feet, and seven and half feet high. Ten persons in some cases occupy such rooms. Have been obliged to knock out a square of glass in a window to get ventilation. This overcrowding lowers the standard of morality. Much disease is traceable to intemperance. Men are driven from an uncomfortable home to the public-house."

## NEWCASTLE-UPON-TYNE, GATESHEAD, AND TYNEMOUTH.

The following extracts from the "Report of the Commissioners appointed to inquire into the causes which led to or which aggravated the outbreak of Cholera in Newcastle-upon-Tyne, Gateshead, and Tynemouth," indicate the defective condition of the dwellings of the poor in those towns in 1853.

Speaking of Newcastle, the Commissioners say:—

"There are considerable districts, especially in the lower and older parts of the town, in which almost all the houses are built back-to-back, so as to be incapable of thorough ventilation, and with their fronts within so few feet of one another as to render it almost impossible for sunshine, wind, or rain to reach directly even their exterior walls; many of these miserable lanes or entries being, moreover, closed up or covered over at one end and some at both ends.

"That, on entering the houses in such localities, during our day-inspections of the town, we were arrested at the door by a darkness which was little less than total; and medical officers are sometimes under the necessity of taking a candle in order to see their patients in some of the rooms in these places even at noonday, and in the height of summer.

"That the poorer inhabitants are not only very ill-lodged, but exceedingly over-crowded in their lodgings. That about half the families in the town are confined to the occupancy or joint occupancy of exceedingly over-crowded single-room tenements. That in September, 1853, cholera broke out in rooms in which as many as twenty to twenty-five occupiers were congregated; there being only about fifty cubic feet of space or air (furniture, &c., not considered) for each individual. That in consequence of the frequent ill-construction, ill-ventilation, and over-

crowding of the habitations of poorer classes (as well as the want of sewerage, drainage, proper domestic conveniences, and other matters), the condition of many of the tenements which form the residences of about three-fourths, and especially the condition of many of the single-room tenements which form the residences of about half of the entire population, has habitually been filthy and unwholesome even where not technically described as 'unfit for human habitation'; that the stench experienced on entering some of them is in the highest degree offensive; and that the effects upon the health of the inmates, and of the vicinity generally, can only be equalled by the corresponding effect upon their morals and lack of any sense of decency."

The Commissioners state that there are 15,000 families, or not less than two-thirds of the population of the town, who have no right of access to a private "privy;" and that ash-pit accommodation is almost equally deficient.

The Commissioners close their report, as regards Newcastle, with a statement of the pecuniary loss sustained by the ratepayers as the result of the outbreak of cholera. "The Board of Guardians expended, for immediate services, about £4,000; between £6,000 and £7,000 were expended under the supervision of the Vicar; an excess of at least £3,000 above the usual expenditure for sick and funeral moneys was incurred by the benefit societies; £500 were expended by the Town Council; an annual expense of about £2,600 was incurred by the Board of Guardians for the maintenance of widows, orphans, and others, which at only eight years' purchase would be worth some £21,000; making altogether an expense of some £35,000 or thereabouts over and above the very serious loss to the town from stoppage of trade."

With regard to Gateshead, the Commissioners state "That the same radically bad system of house-construction described as prevailing in considerable



districts of Newcastle, prevails also and probably to a larger extent comparatively in Gateshead; that a large proportion of the houses occupied by the poorer classes (who apparently constitute four-fifths of the entire population) are built back-to-back with one another, or where not actually back-to-back, with backyards between them so small as to serve only to receive accumulations of filth, and to be quite inadequate for wholesome ventilation; that the spaces between the fronts of these back-to-back rows of houses are also so narrow as to render it almost impossible for either sun or wind to get at them, and to render them habitually dark and unwholesome; that one or other end of these narrow alleys is not unfrequently closed or built up, whilst in some cases, smaller lateral *culs-de-sac* are found leading out of a larger one; the ends of these miserable places being also sometimes built over so as to leave nothing but a single covered way for egress or ingress; that in other cases the houses are built into the abrupt riverward slope or bank, so as to have one or more of the walls, for one or more storeys in height, in close proximity with the earth of the acclivity above—while in other instances both these evils are combined, and in this way throughout considerable districts occupied by the poorer classes, proper ventilation is rendered impossible.

“That a large part of the dwellings of the poorer classes are not fit for human habitation; that at least one-half of the population of Gateshead is thus dangerously mis-lodged; that a considerable part of those dwellings are not only not fit, but that they are incapable of being rendered fit for such a purpose.

“That the poorer classes of Gateshead are not only exceedingly ill-lodged, but also much overcrowded in their lodgings; that it is an habitual thing for an entire family to live, sleep, cook, eat, and wash in a single room; the corners of single rooms thus occupied being occasionally further sublet to other families or lodgers.” With regard to privy

accommodation, the Commissioners state that Gateshead is as deficient as Newcastle, whilst in one point it is even more deficient, viz., in not having a single public privy.

With reference to the cost of the epidemic in Gateshead, the Commissioners say, "That an expense of about £1,278 was incurred by the Board of Guardians for immediate services; that a public subscription of about £600 was similarly expended; that an annual expense of about £450 was incurred for the maintenance of persons thereby rendered chargeable to the poor rates, which, at only six years' purchase, would amount to £2,700; so that, without considering the loss arising from stoppage of trade, the cost of the outbreak amounted to some £4,600."

### CONCLUSIONS.

A close study of house-accommodation, especially for many of the poor, not only of this country but of all countries, has led me to the following conclusions:—

That, as a rule, men so construct their habitations as to vitiate the common atmospheric air, rendering what should be the free breath of life a fruitful source of disease—

1. By placing houses on improper sites.
2. By leaving those sites unformed, undrained, unpaved, and uncleansed.
3. By using improper materials for houses, and by adopting unsuitable plans.
4. By totally neglecting adequate means to secure ventilation.
5. By overcrowding, by indiscriminately mixing the sexes, and by allowing the adoption of habits of filth.

That the results in all ages have been fevers, plague, and all the analogous diseases which destroy infant life and which prematurely cut off adults.

That there may be portions of the earth's surface unfitted for the use of man; but that, as a rule, the sources of disease are not so much in countries, in climates, in sites, in elevation, in density of population, or in any other external cause, as within the walls and beneath the roofs of the houses and tenements. Masses of people living contrary to the simple laws of nature are necessary to decimating epidemics, and not peculiar climates, special geological formations, great rivers, river deltas, inland plains or mountains.

That fresh air is the first requisite to health, and that any houses which do not admit of fresh air being breathed by the inmates—waking and sleeping—are defective in construction, are also defective in arrangement, and probably most defective in personal management and cleansing.

That the poor of this country cannot provide themselves with houses suitable to health, but must inhabit such as are placed at their service.

That many of the poor and working-men generally can afford to pay a sufficient rent for healthy cottages or rooms, if they have a choice betwixt good and bad cottages and rooms, or could obtain healthy places of residence.

That, in many instances, the losses caused by defective house-accommodation are either direct or indirect charges upon parishes. Foul air induces fever; fever destroys adult life, and then widows and orphan children become a parish charge.

#### REMEDIAL MEASURES PROPOSED.

That in parishes, corporations, or in separate districts, there shall be an Inspector of Nuisances appointed; but that several small or poor places may be combined under one inspector, with the sanction of the General Board of Health.

That upon an outbreak of contagious fever, small pox, or other zymotic disease, the parish doctor, local medical officer, or local inspector of nuisances, shall

have power to inspect the premises, whether rich or poor, and report to the local authorities.

That there shall be local power to insist on proper means of ventilation to all cottages and room-tenements; and that lime-washing may be ordered, or may be executed by the parish authorities, the cost to be recovered from the landlord.

That subsoil and surface-draining may be ordered, or may be executed where required.

That every room appropriated for human habitation shall have, at the least one door and one window capable of admitting sufficient light, and that such window shall be so constructed as to open at or near the level of the ceiling, so as to allow of full ventilation. That in each room there should also be a flue.

That there shall be sufficient "privy" accommodation to all houses and tenements, of not less than one seat to each ten persons.

That there shall be means of external ventilation and sunlight to all dwelling-houses.

That there shall be means for a separation of the sexes in all houses and in all room-tenements.

An improvement in the law so as to facilitate the sale of land for house-building purposes would afford means for improvement.

In new buildings, rooms to be inhabited should not be less in height, from floor to ceiling, than nine feet vertical.

All houses should have the roof-eaves spouted; and all yards, courts, and passages in the immediate vicinity of houses should be paved or flagged and surface-channelled.

I have briefly and imperfectly treated a most important subject, and must now leave the question of improved house-accommodation to the consideration of our legislators and thinking men. The problem of house-accommodation deserves to be worked out. If defective houses were only inhabited by the lowest class of the poor, remedial measures would be im-



perative on Christians; but the case is more hopeful. Very many families earning good wages (from £1 to £2 per week) can at present obtain nothing better in which to live than a wretched hovel, a tenement in a blind alley, or a house up a narrow and dark court, or some miserable single-room tenement doubly or even fourfold occupied. The prices charged and paid vary from 2s. 6d. to 5s. 6d. per week; in the one case, £6. 10s., and in the other, £14. 6s. per annum.\* It is practicable to build cottages in the country and in small towns, having four rooms, for a rent of £6. 10s. per annum, and blocks of houses in towns and cities, of equal accommodation, for a rent of £10 per annum, the common rate of interest being received in the form of rent; such houses to be properly sewered and drained, to have wash-house and drying-ground—in common to, say, ten such tenements,—to have a full supply of good water, to have “privy” accommodation adequate to privacy and decency, and to have means for ventilation and light to each room. In the country, garden allotments are a comfort, and a source of profit to landlord and to tenant alike, and a great blessing to the provider and to the user. Ornamental cottages, if the ornament is costly, are not required. Improved dwellings and cottage allotments need not be made into show-places. An honest poor man does not require petting, but the opportunity to be a good Christian and to live by labour. He will then be under the conditions of a good citizen.

Human society, to be stable, must be like the pyramid—the foundation must be broad, and it must be secure. The mystic priests of Egypt expressed their ideas in symbols, and I am not sure the pyramid was not intended to symbolize the construction of a nation. The broad, spreading base—the people; the diminishing but rising courses—the middle classes; the upper courses—the nobility;

\* Where single room-tenements are occupied by several families each may only pay sixpence per week.



crowned by the kingly apex—forming the only practicable finish to a symmetrical, secure, and enduring structure. This idea may be a vain fancy; but if Great Britain is to endure—if our civilisation is to progress—if our religion is to bear appropriate fruit—if the great social evil is to be grappled with and subdued—the base of her society must be improved—the people must have the opportunity of health and of morality, that they may be both Christians and loyal citizens!

The CHAIRMAN, the Right Honorable the Earl of SHAFTESBURY, in proposing a vote of thanks to Mr. Rawlinson for his able paper, remarked that he could speak with perfect confidence as to the merits of that gentleman, because it had been his pleasure to be associated with him for many years in works of this description. During the time that he (the Chairman) had the honour of holding a seat at the Board of Health, Mr. Rawlinson was one of their inspectors, and for diligence and activity, knowledge and zeal—not merely professional zeal, but influenced by deeply moral and humane feelings—he was unsurpassed. They were all acquainted with the valuable services he had rendered to the country as the Government sanitary engineer at the British hospitals at Scutari and in the Crimea; and he (the Chairman) was glad to find that he had returned fresh and vigorous, determined to devote his great energies to the improvement of the condition of the human race in his own country. He believed the announcement that the paper to be read was upon the social and national influence of the domiciliary condition of the people, had attracted a great many to this meeting, especially the ladies, and he could not but feel that, in his opinion, the paper was in strict keeping with its title. He was convinced that the domiciliary condition of the people was at the root of all moral and religious improvement. It was astounding to observe what effects good dwellings,

with plenty of air and sunshine, had upon the morals of a community ; they tended more than anything else to combat that monster evil—the vice of intemperance. He therefore thought the proper way to enter upon the discussion of this question was to begin with a statement of principles. He agreed with Mr. Chadwick, that in contemplating existing evils they ought not to lose sight of the good that had been effected in this direction in many of our large towns and in various quarters throughout the country ; but the good that had been already effected only imposed upon them the duty of making still greater exertions to carry it on to its utmost limits. With regard to the erection of new dwellings for the working classes upon the best sanitary conditions in densely-populated towns, where the price of land, labour, and materials was very high, he felt there was but small chance of doing so with a remunerative profit. They could not look for more than 6 or 6½ per cent., which the builder did not regard as a sufficient return for his capital. But, as had been stated this evening, very much might be done in improving existing buildings and localities, so as to render them fit for habitation, and this would, as almost every instance had proved, be attended with a remunerative return to those by whom the improvement was effected. The Chairman then proceeded to explain the improvements which had been carried out in the localities of Wyld-court and Tyn-dals-buildings, and mentioned the beneficial results that had accrued therefrom in the elevation of the moral and social condition of the inhabitants. In the country there was a very great difference in this respect ; the cost of land, which formed the principal item in large towns, being so much less, and labour and materials cheaper. Still he had found that he could not build a pair of cottages for less than £280, and a high rent must be paid in order to afford a fair interest for that outlay. What they required, therefore, was a cheaper but not less effi-

cient mode of building cottages, with not less than three bedrooms, which he held to be indispensable for every family. Ventilation was a matter of the utmost importance, but the poor were found to prefer warmth to pure air so strongly, that he had in some instances in cottages he had erected resorted to the stratagem of introducing a concealed ventilator in order to render their dwellings healthy. In carrying out improvements it was necessary that the tenants should peremptorily be prohibited from taking lodgers, or the existing evils would be increased. In conclusion his lordship said he felt the deep importance of the question under discussion, which he thought lay at the root of all that concerned the religious and moral state of the people, and he was certain that if they would use every effort to raise the poor to that condition which they ought to occupy as Christians and responsible beings, he, for his part, should have no fear either of the progress of infidelity or of democracy.

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## OLD LESSONS IN SANITARY SCIENCE REVIVED, AND NEW LESSONS CONSIDERED.

[*Presidential Address delivered at the Fourth Congress of the Sanitary Institute of Great Britain, Exeter, 1880.*]

SANITARY science may be said to be both old and young. It is so old that we know nothing of its commencement, simply because we know nothing definite of the origin of the human race. The cave inhabitants were skilled in art; but at how distant a period they lived, or in what other respects they were skilled, we have little means of knowing; of this, however, we may be certain, that they would suffer from disease, and would use medicines and enchantments in some form to relieve their sufferings.\* At whatever period of this earth's history intelligent man appeared, diseases would afflict him; and when remedial measures were invented and applied, then *sanitary science commenced*.

There are problems in natural history which can only be speculation: as the origin and constitution of matter; the origin of life; the origin of disease. The human intellect is powerless to fathom these profound mysteries, and if revelation is rejected, there can be nothing but a blank impenetrable darkness. There is minuteness below the search of the best microscope, and a range in magnitude very far beyond the combining power of the best telescope.

\* There are dwellers in caves at this day in parts of Great Britain and Ireland, as also in other parts of the world—probably as many as ever in any age occupied such places for residence.



One law alone is clear and certain, namely, the universal law of motion, which is change—combination and disintegration, these never cease. That which we call life or death pervades the universe; and the life of a system—sun and planets—though extended to millions upon millions of years, is in the roll of eternity no more than the life of an emmet, which is born and dies in a summer's day. As old systems perish, new systems replace them, to run their appointed course from birth to maturity, and from maturity to decay. I have neither time nor inclination to attempt to summarise ancient and modern theories as to ultimate atoms, if or not such exist; as, also, if or not, each atom is sensuous, and that, as a consequence, all bodies have developments of sensuousness in a degree—the combination of atoms in man developing sensuousness in the highest degree. Matter combined in living forms other than animal life develops properties very like consciousness, as plants shrink from poisons, and with apparent avidity seek wholesome food—in this respect showing an intelligence superior to many forms of animal life. I individually should like to believe that plants can think.

But to the purport of this paper,—“Old Lessons in Sanitary Science Revived, and New Lessons Considered.” The most reliable starting point I will take may be found in Leviticus xiv., beginning at the 33rd verse, where the plague of leprosy is described afflicting the house. Without extracting the whole, the sanitary engineer will recognise “the walls with hollow strakes, greenish or reddish, which, in sight, are lower than the wall.” Here is vividly described a tainted subsoil, wet and rotten with saturated filth. The modern remedy would be entire removal of the tainted subsoil, to be replaced by lime-concrete; removal of the tainted walls; underpinning with new materials; and the introduction of a damp-proof course. Leprosy (or the

equivalent of leprosy) affects houses at this day in all parts of the world inhabited by man, from European palaces to the hut of the Esquimaux.\* In this malarrangement the savage fares better than the civilised man, as nomad tribes can leave a tainted site, whilst dwellers in villages, towns, and cities, remain fixed on sites filth-tainted to supersaturation. Seeds or germs of disease ripen in the polluted huts and houses of India, China, and Europe, and even the newer North American cities have not escaped this general contamination. Australia and New Zealand have already polluted the sites of their cities to a dangerous extent, so that the mortality returns are little better than those of the old country.

In England we have apparently banished plague, which, however, prevails in the East—Russia, Egypt, and the cities of Asia; but England has ripened the “germs” of cholera very recently, and typhus, typhoid, and other forms of fever, prevail. That these diseases can be prevented our model prisons bear witness, and modern sanitary works have also materially improved entire town communities.

I have used the word “*germ*” as applicable to disease, without in the least being enabled to explain satisfactorily what is meant by it. That types of disease can be introduced and spread will be readily admitted; but that the origin, in each case, is a *germ*, is not so easy of proof. It has been suggested that cholera must be conveyed to the human system in water; as, also, that tainted water and tainted milk produce typhoid and scarlet fevers; and some doctors say that tainted fluids are necessary to the introduction of these forms of disease into the human system, periods of time being fixed for incubation. There are, however, some facts against this theory being received in its entirety; as, for instance, troops and travellers on the

\* It may not be strictly proper to use the word “leprosy” as being common to houses; the meaning is, that houses are filth-tainted to an extent which causes rottenness capable of producing disease.

march into a virgin country previously unoccupied by man, develop these forms of disease much beyond the assigned period of incubation, which under the surrounding conditions cannot be due to man-tainted earth, air, or water, so that the germ theory fails, unless we can imagine that germs of every form of disease which can afflict men or animals are as eternal as matter, and are dormant in matter until conditions for development are brought about. According to this idea, soil, water, and air, as also every living body, as fish, flesh, fowl, or man, must contain germs of every disease, but dormant, until brought into contact with existing causes and conditions favourable for development.

The cleanest-looking places are then not necessarily the safest.

A clean-looking country-house or village, surrounded by air free from coal-smoke, may have hidden dangers worse than any in a town.

Visible dirt on the surface of a street or road is not always the most dangerous, as the rain washes it, the wind blows over it, and the sun dries it.

The presence of rats, either in country or in town, is a certain indication of danger, as rats live on garbage. They are usually diseased, covered with parasites, and it is said they can convey the seeds of disease to other living bodies.

It is not possible to predict, in all cases, as to what shall cause disease in excess in any given locality, as visible filth under some peculiar but unknown modifications, plus an unknown factor, may be sufficient to cause typhoid, without the so-called specific germ from a previous typhoid case.

A telluric influence, or an atmospheric influence, which we can neither control nor analyse, in combination with some great but exceptional elemental disturbances, may produce disease in excess.

It is difficult in all cases to prove contagion, and it may be as difficult in other cases to disprove it. In the East woollen garments are believed to be

capable of conveying plague; but shoddy, which is waste woollen rags, collected and brought into Yorkshire from all parts, even where plague prevails; when these rags are sorted and manipulated by hand, they have never been proved to have produced plague.

Great epidemics are not universal, but prevail over limited areas, for reasons similar to those which control and limit other excesses in nature. In meteorology excesses of violence are always local, not universal, the areas affected being very much smaller than the areas unaffected. The surface of the earth, with the air and the water, are modified by the elements, not however at one and the same time over the entire crust and circumference of the globe, but by small sections at intervals, as in earthquake-shocks, tornadoes, hurricanes, and deluges—these are always local, never universal; the term “universal” being limited to the earth. The entire crust of the globe has been disturbed in every square mile; this cracking, subsiding, and upheaving, having been many times repeated—and this action is now going on—volcanoes and earthquakes were once common in the now settled districts. The seats of earthquakes change; all known active volcanoes having ruptured the tertiaries. But geology proves that earthquakes and volcanic eruptions in some former periods disturbed the oldest rocks as now the newest.

Theories may be very harmful when wrongly set up and obstinately persisted in, because they may lead the student from the true paths of research. A man with a theory which he is determined to establish, may be likened to a man digging himself into a well; the deeper he digs the less of the surrounding world he sees, but he nevertheless imagines that he is widening the range of his vision. To ascertain truth theories must be suspiciously examined, and facts alone when established be accepted. The world and its phenomena must be studied, and modern means and appliances show us that this is a very complicated though small world which we inhabit.



We group history in periods—as for instance from the heptarchy to Queen Victoria—in a manner to lead a student to believe that the manners and customs of two thousand years ago have entirely passed away from the earth, when we may at this day travel into every phase of life and civilisation, and see every form of dwelling, from the cave hut and tent of the nomad to houses in cities such as London and Paris. So that a student, in place of relying entirely upon closet study for information, may by travel see man under almost every aspect known to research or described in history.

A closet study of history is however advisable, if only to learn how much error has prevailed and prevails; and it is to be hoped that such study will modify egotism.

Catalogues of huge convulsions, such as earthquakes, tornadoes, frosts, droughts, and floods, of plagues, famines, and pestilences, have been compiled which seemed to the affrighted inhabitants of the time so terrible and fatal, that they thought the entire family of man must perish from the face of the earth, but these excesses were local. Exceptional periods, hot or cold, wet or dry, continued for several seasons affecting vegetation, then animals, then man; we witness this course of events in our own day, both at home and abroad. Exceptional seasons lead to famines, disease, and death. Here again we have not to go to history to learn the deadly records of famine and plague, as at this very time the freshly-written records are before us: famine in India, in China, in Asia, and in Ireland. If England can say that since 1665 plague has disappeared, typhus and typhoid fever remain.

The history of the great plague in London, 1665, is to be found recorded by Nathan Hodges, M.D., and John Quincey, M.D., and by an anonymous author in “A collection of very valuable and scarce pieces relating to the last plague in the year 1665,



and reflections on the weekly bills of mortality so far as they relate to all the plagues which happened in London from the year 1592 to the great plague in 1665, and in Naples 1656, of which it is recorded there died in one day 20,000 persons." There are other accounts of the great plague of London, the story by Defoe being considered more reliable than the histories. Plague raged about this time, not only in London, but throughout Great Britain, in cities, towns, and villages generally; the plague-stones found in the suburbs of towns and villages attesting the prevalence of the disease. These stones were cut to form a trough, which was filled with vinegar and water; they defined the boundary to which the people from the town or village might advance countrywards, and to which country residents might come townwards, bringing their produce, which the town inhabitants must fetch, leaving their money, the price of the food, immersed at the plague-stone, in the vinegar and water. Contamination was supposed to be prevented by these contrivances. Betwixt nations, quarantine was enforced, and is enforced up to this day. The quarantine enforced in London on houses during the prevalence of the great plague is terrible to think about. The blood-red cross and the awful text "the Lord have mercy upon us" on the house-door, with a guard to hand food and medicines to the sick and to restrain them from coming about until forty days after their recovery, must have contributed largely to the mortality. It is quaintly remarked, that "the Lord Mayor's officers readily and effectually put these orders in execution, yet it was to no purpose, for the plague more and more increased; and the consternation of those who were thus separated from all society was inexpressible, and the dismal apprehensions it laid them under made them but an easier prey to the devouring enemy. . . . If a fresh person was seized in the same house one day before the completion of quarantine, it was to be performed

over again, which sometimes caused the loss of the whole family. But what greatly contributed to the loss of people thus shut up, was the wicked practices of the nurses, who would strangle their patients to rob them, and convey the taint from sores of the infected to those who were well." Such is a very brief notice of the ravages of the great plague of London in 1665, when there were 97,306 funerals, 68,596 persons having died of the plague, besides many of whom no account was given by parish clerks, and who were privately buried.

The literature of plague, as written at the period, with all the vivid terrors of the disease described, is for the most part a record of gross superstition and romance. The plague was real, the filth was real, the terror was real, the sufferings were real, and the deaths were real; but the causes assigned were vague and wild, and the remedies recommended and medicines used do not in all their nastiness bear description. But even in this case we need not rely upon history, as now in the uncivilized areas of the world there is probably as much ignorance, superstition, negligence, and cruelty, when plague and famine prevail, as was practised in England during the prevalence of the great plague in 1666.

We are frequently referred to China for an example of order and care in the conservancy of excreta for agricultural uses, but upon thorough examination and a full knowledge of the details, we find that the Chinese example is one to be avoided rather than to be followed. What the state of China is in the great cities may be inferred from the following remarks descriptive of a visit to Canton in the year 1878. The writer says: "Without much delay we set off on our explorations, and a short walk over the green grass of the Shameen, brought us to a bridge which crosses the moat or canal that divides Canton proper from the foreign settlement. . . . We were astonished to note the marvellous change in the appearance of the surroundings, which the mere

crossing of the bridge presented. We had gone from a broad, handsome suburb of a prosperous European community, into a veritable Chinese town, with narrow, irregular streets, full of people, and an atmosphere polluted with the most horrible smells.

. . . Leaving this filthy spot, we went on to one even very much worse, namely, the city prison.

. . . We went through a labyrinth of passages, and finally found ourselves in a square court open to the sky, round which were ranged the dens or cells of prisoners, who were in most cases shackled by their feet. The moment we were seen, out they came upon us from their dens in all directions—filthy, horrible creatures, with hands outstretched, swarming around and clamouring for money.” This description of one of the great cities of China, at this day, represents very graphically the condition of London, Paris, and the other European capitals and towns at the period of the great plague.

Travellers do not always note the condition of the inhabitants of foreign countries when first visited; we may be told about beautiful scenery in lakes and mountains, imposing-looking buildings, fine museums, and fine picture-galleries, without one word as to the real state of the population; but in the streets of every city in Europe there are indications of the real condition of the people, which an intelligent and practical sanitarian will at once note. The churches may be very noble in outline and very rich with carving, but if squalid begging cripples surround the stranger, he will know by intuition that not very distant there are slums and dens—filthy, stinking, disease-smitten, and disease-producing. The probability will be that in one hour of inspection an observant sanitarian will learn and know more of the true condition of the city he is in for the first time than thousands who have been born, brought up, and lived in the place all their lives. It will be a case of “Eyes and No Eyes;”

sanitary science bringing into play all the observing faculties of an educated man.

Past history has for the most part consisted of details of the birth, life, and death of kings—of their wars and conquests—with a very slight glimpse of the state of the people. In the future, true history will note and record the condition and doings of the people, as constituting the power of the state ; but at present the world is very far from this condition.

When in this age of general improvement in arts, manufactures, and commerce, we find Europe in arms to a greater extent than at any former period, and the people under a load of expenditure the heaviest in the world's history, thoughtful men must pause, wonder, and look for some practicable solution. The taxes now being levied and expended on soldiers, on armaments, on arms, and on ammunition, would more than serve to abolish every city slum and wretched town-tenement, admit of the rearrangement of every city sewer, pave every street, drain every house, provide a full supply of pure water at high pressure and constant service, and pay for daily scavenging. When history can detail these things as accomplished facts, it will be worth reading.

Sanitary science is new, but it is not as yet popular. To remove filth, to promote health, and to prolong life, gain little of a statesman's notice in the battle of politics ; the work has however commenced and is being taken up, both at home and in our dependencies. The Americans are also becoming earnest sanitarians.

There are poverty, vice, and crime in Great Britain which, when contemplated in detail, are quite appalling ; and these are the outcome of defective statesmanship—and this after years of political freedom and so-called enlightened government. We sanitarians, however, hold that statesmanship which leaves the largest numerical mass of the population in hopeless misery must be defective. This condition of society is not a sound one, and consequently is



not a safe one. To see the results of despotism and neglect in their most aggravated forms we must, however, cast our mental vision over the empires of China and Russia, where millions of men know nothing of political and civil freedom ; the results being civil commotions, rebellions and civil slaughter, wholesale arrests, wholesale condemnations, wholesale transportations, and wholesale decapitations, which affect nothing worth the trouble, because the wretched people have no cessation to their persecution. They exist in misery and have no hope.\*

True sanitary science recognises the unit, MAN—looks at the individual, at the single family, at the single house, at the village, at the town, and at the city, as these constitute nations; and as are the individuals, so must be family, town, and nation. If, therefore, there is ignorance, wretchedness, and vice amongst the lower orders of the people, the leaven pervades the entire nation.

These questions may be termed political, and it

\* *A Bloodthirsty Mandarin.*—The following appears in the *China Mail*, 1880: A tale of peculiar horror comes from the Swatow quarter. The military Mandarin for the Kit Yang district, Pung Tye-jen, who will be remembered as the Mandarin who gave the order for the compradore Ah Pac to lose his head, and was also intimately concerned in the Lee Lum Kwai affair, has been distinguishing himself in thoroughly Chinese fashion. Some small official who held the position of tax-collector, had been murdered by the people, who, exasperated probably by his extensive squeezes, considered taking the law into their own hands to be the only way of getting rid of him. For this daring outrage against law and order, Pung Tye-jen undertook to inflict punishment upon the residents, and did so with a completeness we rarely see equalled. He first secured the services of a gun-boat to protect or cover his retreat, the place where the inhabitants had done as we have stated being within reach of the guns of a man-of-war. The place was then besieged, and the soldiers killed something like 700, it is said, of the people who were supposed to have taken part in the uprising against authority and had caused the death of this petty official. The number of those destroyed by the avenging army of Pung Tye-jen is variously estimated from 400 to the figure above stated. Surely an ample satisfaction to even a Mandarin of the bloodthirsty character which this man has acquired.



may be said that sanitarians have nothing to do with politics. Our reply, if questioned as to this, must be that to govern men is the prime duty of a statesman. But what are the definitions of the word "govern"? To a despot there is only one definition, and that is, repression; which implies every form of cruelty which man ever devised and practised. To a British statesman I hope it means, to care for the whole people; to educate, and to protect them in all honest dealings; to repeal all laws which tend to the commission of crime; to abolish class legislation; and to know nothing of party if it leads to faction.

The domestic side of sanitary science deals with home comforts, and the unit in this case is the house, then the village, and then the town. Houses must be planned, constructed, and regulated to afford means of health and morality to the occupants. Villages and towns must be so arranged, built, sewered, paved, and scavenged as to preserve the purity of the soil below and the air above for the benefit of the inhabitants. To secure such ends there must be sewers, drains, pavements, scavenging, and a water supply. Sewering is ancient beyond written records; sewerage scientifically is, however, modern—very modern, as some of those who presided at the birth of the adopted system of town-sewering are happily now living. Edwin Chadwick, C.B., though not a civil engineer, has, through the aid of engineers, done more to found and promote the true principles of town-sewering than any other single individual in this generation.

There were sewers and drains in the cities of Asia, which are now heaps of ruins. As in these days, so then, where large areas were covered with buildings, and men were aggregated, there would be sewage; and this would be removed by open channels and covered conduits; necessity having been the mother of invention. These ancient cities were, however, not wholly sewered, but only partially drained. It is very easy to be positive on this point, namely,

that sewers and drains were not general, as there are no remains beneath great areas covered by the common people, the ruins of which would have been found if sewers had been formed and drain-pipes had ever been laid.

Rome sewered and drained her cities, public buildings, baths, and palaces, and the ruins are there to this day. Pliny describes sewers in some of his letters to the Emperor Trajan. There were not only sewers, but there was also river pollution. The great Cloaca Maxima of Rome emptied sewage into the Tiber. Pliny in one of his letters directs the attention of the emperor to a case in a provincial city where certain banished men resided, who were apparently living in ease and idleness. There were sewers in the district, and a sewer-polluted stream flowed through it, which had become a great nuisance and was complained of by the inhabitants. Pliny, in this case, suggests that the idle easy-living banished men should be more fittingly punished by being made to cleanse the foul sewers and so for the future prevent river pollution. Trajan at once consents to so reasonable a proposition. These letters by Pliny are most interesting in showing how actively he performed his duties, and how minutely informed he kept the great emperor.

At Sinope, on the Black Sea, money had been advanced to the municipality for a theatre. A bad site was however chosen—a swamp, and the building became a ruin before completion, and the money was wasted. Subsequently a memorial was sent to Rome petitioning for money to construct water-works. Pliny here cautions the emperor, and advises that, if the request is entertained favourably, an engineer be sent with the money to see it properly expended, and to take care that the local authorities may not job it away, as in the case of the money sent for the ruined theatre. I suppose the emperor did send an engineer, as in 1855 I saw the ruins of the service-reservoirs, which, but for man's destruction,

would have been as entire now as on the day of their completion;—the remaining walls being sound and massive as when first constructed.

The making of earthenware vessels by means of the potter's wheel is of very ancient date; and the work of the potter has, amidst all the ruins of ancient cities, been the most enduring. The vast collection of bricks, tiles, tablets, pipes, and vases placed in European museums testify to this fact. At some early period earthenware drain-pipes were thrown on the potter's wheel, having sockets for jointing similar to those now made in England. I saw samples in Asia Minor in 1855, which were evidently new. They were about 13 inches in length and 5 inches internal diameter, having a socket of about  $1\frac{1}{2}$  inches in depth. They were being laid at Kulali, situate on the Bosphorus, to form a conduit to bring water to the barrack hospital. The natives were at work laying the pipes on a contour-line, a considerable length of trench being open. I did not at first see any arrangements for ventilation and wash-outs, and was questioning the engineer officer upon these points, as to whether or not they had been provided for, making a rough diagram, and scratching on the ground with a stick to illustrate my questions. The engineer officer could give no information; but one of the native workmen, who had been listening to and watching us, touched me on the shoulder, and, with a sparkling countenance, said, "bono-bono," immediately taking me along the line of aqueduct, and pointing out the structural means I inquired about arranged both for ventilation and for wash-out.

Aqueduct-making is a very old Eastern practice, aqueducts, fountains, and wells being common all over the inhabited parts of Asia. Water, as one of the elements necessary to life, was, in a warm climate, sought for and stored carefully. A very meagre history of springs and wells would form a large book, and might be as interesting as the most vivid romance.

There are holy-wells throughout Asia, and there are also holy-wells and fairy-wells in Europe, novelists having with great effect availed themselves of these superstitions, and woven them into their descriptions of supernatural phenomena. There is, in fact, an enormous amount of superstition, romance, and poetry connected with springs and wells. Magical virtues are attributed to many waters, a belief in which in some cases leads to incalculable injury.

There are shrines in India within which are reputedly sacred waters, to be washed with, and to be drunk by the pilgrims to secure eternal salvation. On certain days in the year thousands of the natives assemble and encamp round these sacred shrines. The approach to the holy-water is by a flight of marble steps, down which perspiring natives, many of whom are crippled and diseased, throng to have a drink of the fluid. The practice is to pour a cupful over the head of each native, which flows back to the tank, and this is repeated hundreds of times during the day, so that it ceases to be water and becomes a vile compound—the washings from the bodies and feet of natives, and this horrible decoction the priests in attendance administer to be drunk by the poor besotted votaries! Cholera usually breaks out amongst the pilgrims at these gatherings, and it would be contrary to the known laws of sanitary science if it did not do so.

Recently there has very properly been a rage for water-analyses, many thousands having been made in Great Britain and in British India, and very startling conditions have been revealed. Water which has been considered pure by the inhabitants of English towns, has been found to contain a dangerous proportion of polluting matter, to the effects of which they appear to be stupidly apathetic; but the researches in India reveal a state of things almost too terrible to contemplate. The natives of India are expert diggers of wells and formers of tanks, to supply and store water for use; they are also careless



of life, committing suicide with apparent avidity, death by drowning being common. It had been observed that at certain Indian stations British soldiers were liable to be afflicted with virulent types of disease, as cholera, fevers, and at Delhi carbuncles and sores—the Delhi sores having become a recognised affliction. Inspection was ordered, when it was found that within the province during that year there had been about 1,700 carcasses of human beings removed from tanks and wells, the water from which had been regularly used for human consumption. Some of the worst wells were ordered to be cleansed, when many human bones were removed from them. The tanks in use are open, and the surrounding ground slopes towards the water; over the surface human excrement is spread, and the natives both wash clothes and bathe in the water they use for cooking and drinking. High caste apparently affords no protection, but acts in a contrary direction. Calcutta is supplied with filtered water, but high-class natives decline to use it. A native water-carrier was observed filling his skin at a stand-pipe with filtered water, but when about three parts filled, he went to the nearest puddle and with his hands proceeded to fill his vessel. An Englishman, observing him, asked what he was doing, when he replied, “Making Ganges water for master.”\*

Some medical men state that pure water is absolutely necessary to health; others send their patients to drink the most abominable compounds at English and foreign Spas. Pure water is a rarity in nature, and where it is found it must be protected with great care, as it is a powerful solvent and greedy of impurities. The solvent property of rain-water, which is the nearest approach in nature to pure water, is probably amongst all the elements the most powerful agent in moulding and disintegrating the

\* Great improvements have been made at stations throughout British India in providing water-supply sources, both of tanks and of wells, and these improvement works are now going on.



solid earth. By way of illustration, the River Thames may be taken. The water of this river contains, in round numbers, about one ton of bicarbonate of lime in each million of gallons when the water is clear, bright, and sparklingly transparent. The daily supply of Thames, River Lee, and chalk-well water pumped into London is now about 150,000,000 of gallons, so that 150 tons of bicarbonate of lime are combined with the supply of each day's water, or upwards of 54,000 tons per annum. The average flow of water down the Thames may be taken as 1,000,000,000 gallons per day; so that about 365,000 tons of bicarbonate of lime are washed down per annum, from the Thames alone. About four-fifths of the dry land of the earth contain lime, or are limestone, upon which this dissolving action of rain-water is unceasing; so that the whole of the solid earth above sea-level may in time be silently washed and wasted down into the great salt ocean. Soft water, being so powerful a solvent, is economical for washing, but it is vapid for drinking, and is liable to produce diarrhœa when peat-tainted. It has not been proved that hard water (hard as Thames water) is injurious to health; it has, however, been demonstrated that it is a great protection to health, when it has to be brought into contact with metals—such as lead, zinc, and some other substances.

It is the duty of the sanitarian to obtain clean water, and to preserve it fresh, cool, and clean; but pure water in the full sense of the word "pure," I do not believe to be absolutely necessary to health, since spring, stream, river, and well-waters necessarily contain salts of the rocks they come into contact with, and these are the waters which are the most widely obtained in nature and in by far the most cases can alone be obtained, and must therefore be accepted.

Contaminated water may be dangerous, but visible contamination is not, however, the most dangerous, as the waters of the Nile and of the Ganges are taken for use in preference to all other water. These

mighty rivers are usually turbid, the suspended silt acting, however, as a disinfectant.

The filthiest and most dangerous water to drink is well-water tainted with human excreta, which water may be clear and sparkling. Surface-water flowing down brooks and rivers, though visibly polluted, does not appear to be as injurious as tainted well-water—earth and air being purifiers of surface-waters. Water when enclosed and stagnant, as in wells, pipes, or small unventilated tanks, and especially when affected by liquid or gaseous impurities, becomes stinking and unwholesome.

In water-works the water to be impounded in reservoirs should be gathered from the cleanest possible sources and should be preserved clean.

Sand-filters should be close to the service-reservoirs, which should also be covered and fully ventilated.

The supply from the reservoir and the supply-mains should be direct, and the mains should be so laid and connected as to produce continuous circulation, as water retained a long time dormant in "dead-ends" rapidly becomes deteriorated. The best water-supply will be one which secures the purest source, and by the works of storage and distribution preserves it in the purest state up to its delivery for use.

Bathing and washing are necessary to health, but there are many towns in Great Britain and Ireland without adequate means for bathing and washing; and, as a consequence, the people do not bathe and are not clean.

Baths are common in better class houses, though by no means as common as they should be. The "*tub*" is however used as a substitute.

The poor cannot provide their own baths. These ought, therefore, to be provided for them by the Municipal Authorities in the best and cheapest form and in the most convenient positions. With the baths should be wash-houses, where water, soap, and

all the apparatus necessary for clean and rapid washing, drying, mangling, and ironing, should be made available at the least practicable cost. If sites are judiciously selected, and there is no extravagance in the construction and management, there need be no loss. But a small rate-in-aid, if required, will be a saving indirectly in promoting cleanliness, sobriety, and improved health.

The same writer I have before quoted remarks that in Japan bath-houses exist in great numbers in the towns, where warm-water is provided at a small cost. These baths are for the benefit of the poorer classes, who use them in great numbers—as regularly as evening comes crowds of Japanese, men and women, go to bathe. There are ranges of box-shelves where the clothes are placed, whilst the individual steps into the bath, emerges from it, well rubs the skin, dresses, and departs clean in person. In Great Britain, at this day, thousands upon thousands of the poor are never washed clean from their birth to their death, unless they go to prison or to the workhouse. There is no bathing accommodation provided. At all schools there should be baths, and complete washing should be a part of education, as those who are accustomed to regular personal washing in youth will not subsequently abandon it.

Sanitary science has during the last half-century probably made most progress in England, but then this island is a very small spot on the globe; and even England—free, rich, compact, and educated as she is—only progresses slowly. It may, however, be interesting to this meeting to learn that there is an Association of Municipal and Sanitary Engineers and Surveyors to the number of 205, and that 197 towns and districts are represented by the members. The extent of work executed might be indicated by the make of earthenware pipes and other sanitary articles, if a reliable return could be obtained. The Messrs. Doulton are making about 1,300 miles of drain-pipes per annum, besides many thousand soil-pans; and

this may be about one-tenth of the entire English make of sanitary articles.

There is not time in a public address to deliver a closely-reasoned essay, and a popular address is not, I assume, expected to be other than discursive.

The following remarks may interest the public, though they may not teach much to the educated engineer.

### SEWERS AND DRAINS.

There are good and bad sewers and drains, and the public should know some of the reasons why this is so, and then they may refrain from condemning sanitary works in general.

Sewers and drains have been formed which are so defective as to be a cause of serious nuisance; they are too large, have wide and flat bottoms, the materials are bad, and the construction worse.

It is possible to damage a town by defective works, and so bring discredit on sanitary science. I will attempt to describe how a town ought to be sewered, and how houses ought to be drained, to fully answer the purposes intended.

Correct plans and sections are required upon which to lay out the system of sewers and drains to be constructed; the depths of the cellars should be figured on the sites of houses; the relative levels of the streets may be indicated by contours and figures, on the sections the strata should be shown by colours.

A careful engineer will test the strata by boring and trial-holes.

Full details how to lay out sewers in right lines, both on plan and in gradient, are given in the "Suggestions" published by the Local Government Board.

An engineer should settle at the commencement what duties the sewers will have to fulfil. If the town has manufactures consuming and polluting much water, the question may arise, if or not this polluted water is to be removed by the town sewers.

There will also, in some cases, be a question of injurious fluids, such as tan-pit refuse and pickle-waste from brass-founders, lacker manufacturers and tin-plate makers; there are also dye-waters, and soap-waste from woollen manufactures. Some of these fluids can be treated on the premises so as to precipitate the solids and to disinfect and clarify the fluids, and, consequently, where there is no land available for sewage filtration, the manufacturers may reasonably be called upon to clarify their polluted liquids, and not to pass them in their crude state to the sewers.

Sewage from sewers having good gradients will flow by gravity to any point required; in other cases there may be a flat area with a wet subsoil, and a swamp for an outlet, or this outlet may be below the adjoining river or sea-level. In such cases pumping may have to be resorted to, and then it is desirable to exclude subsoil-water and reduce sewage to a minimum. A wet subsoil should have independent drainage, and the sewers and drains should be water-tight, —surface-water, including rainfall, being otherwise provided for than in the foul-water sewers.

To construct water-tight sewers and drains requires the best materials and the most careful workmanship, but these indeed are necessary under all conditions. In a wet subsoil land-water should be excluded; in a dry subsoil the sewage should be prevented from leaking out of the sewers. In the foregoing remarks extreme cases of wet and dry are contemplated. If sewage has to be pumped and has to be clarified by irrigation, the volume to be dealt with should as nearly as practicable be a constant quantity. If, however, there is a free outlet by gravity, the sewers may be allowed to partially receive both subsoil and surface-water; only, however, to some known and limited extent. It is an advantage to have a wet sewer rather than a dry one, as sewage flows intermittently, during portions of each day, when the inhabitants are using most water; if there is no subsoil-water, the sewers at intervals



may be comparatively dry, admitting of deposit. A steady continuous flow of water through sewers sufficient to maintain a regular current, and not more than a few inches in depth in the main-sewers, will therefore be an advantage.

Main-sewers should ordinarily be laid at a depth sufficient to admit of the deepest cellar being effectively drained; the invert of the branch-drain being at the least twelve inches below the cellar floor, the fall of the house-drain being not less than one in sixty, and entering the main-sewers not lower than half its diameter. These remarks are of course general, and cannot in all cases be acted upon, as many towns have low sites which cannot be effectively sewered and drained without special means as cast-iron pipe-drains with air-valves to prevent cellars being flooded by backwater from the sewers.

House-drains, as a rule, should be outside the basements of the houses. But where houses are built in streets, and the kitchens are at the back, the drain must then cross beneath the basement, unless back-drainage is adopted, when no drain need enter the basement.

Much has been written and said, both in favour of back-drainage and against it. I have had twenty years' experience of back-drainage, and know nothing but good of it. It has been said that it is an interference with the rights of private property; that the drains will choke, and then there must be trespass to find out the point of failure. My reply is, that back-drains may be so laid that nothing but gross usage, amounting to wilful action, can choke them; and even in such a case they may be freed and cleansed without trespass, as manholes and flushing will enable them to be so cleansed.

To enable sound sewers and drains to be constructed, the trenching must be true, and the bottom to receive sewer or drain must be absolutely sound, solid, and water-tight. There must be no mistake here, or the work will soon be a nuisance and a ruin. Sewers

and drains may become broken-backed; there will then be leaking joints, or saturated subsoil, and a choked sewer or drain will bring discredit upon sewer-ing. If the bottom of a sewer or drain-trench is not sound, it may be made so by cement-concrete, and in loose wet quicksandy ground sewers and drains should be covered with concrete.

Sewers and drains will work better, and be maintained in better order, if subjected to regular and properly graduated flushing at short intervals. It is however possible to overflush, and so injure the sewers. As much water as will give a velocity of about six feet per second may be admitted; greater force, to give a quicker velocity, will be liable to injure brickwork, and to blow or force open the pipe-joints.

Waterclosets and sinks should be against outer walls; should not have continuous flue-like drain-connections with the sewers, but have a severed connection, and means for full external ventilation. Every public building, however large, and every house, however small, should be so drained as to afford no possibility of sewage gases entering, and they should stand absolutely free from the sewers, though perfectly connected with them. This may be a law without any exception. At present almost every public building and house in London is in direct communication, by the drains, with the sewers, so that sewage-gases pervade them. There are open sewer-ventilators in the streets, which serve to dilute the sewage gases, and the enormous number of drain-connected houses perform a similar purpose. It is this dilution which prevents the full amount of mischief from being experienced; there is however great danger in it, and this ought to be avoided. This is only to be done by absolute isolation, and external ventilation of the drains above the roofs of the houses. In Leeds, for a population of 320,000, there are upwards of 20,000 openings from the sewers acting as ventilators, which have been in

use more than seven years. This is an example other towns may follow with advantage.

Perfect sewerage requires perfect street-paving and perfect street-cleansing. Scavenging must in all cases be a work of the municipality or other local governing body. Contract work should be avoided. The work of scavenging should be paid by rate, and this rate should be general.

Waterworks should in all cases be in the hands of the local governing body. The service should be constant and at high-pressure, with fire-service provided for. Water should be laid on to every house and to every tenement; there should be no exception. The service-pipes may be of wrought iron, with screw joints, and all the taps should be "screw-down." If the services are taken within the houses and tenements, and the service is high-pressure and constant, there will not be much wilful wasting of water, and house-taps will not be stolen, as waste of water, when at high-pressure, will be very disagreeable within a house. But continue to fix stand-pipes in streets and roads, as is done now, and the waste will continue to be unceasing, because it will not inconvenience any one, as when the taps are placed within doors. The poor cannot have a full and fair use of water if it is alone obtainable from external stand-pipes, as this involves carrying and storing within the tenement. It should also be remembered that one gallon of water weighs 10 lbs. and that fifty gallons weigh 500 lbs., and this will be only ten gallons per head for a family of five persons. The labour required to carry 500 lbs. of water each day, or 80 tons per annum, will be simply enormous, and ought not to be expected from the poor tenant; but serve the water within the house, have necessary supervision, take charge of repairs, and the inhabitants will then be properly supplied with water, which they cannot easily waste. Before closing these brief remarks I may glance at a few works recently executed or which are now in progress.

Calcutta has been partially sewered, Bombay is now in course of being sewered, and preparations are in progress for sewerage and draining other Indian cities. Sewerage works at Berlin are also in progress, to be completed with sewage irrigation. Dantzic has been completed, with sewage irrigation added ; and main sewerage plans are being prepared for other continental cities. At Warsaw, with a population of 350,000, the estimate for sewers is £600,000. Buda Pesth, population 270,000, main sewerage under consideration. St. Petersburg, population 670,000, estimate for sewers £3,000,000, to include pumping and sewage purification. Munich, population 250,000, estimate for sewerage £600,000. Dusseldorf is to be sewered by Messrs. Lindley, of Frankfort. The Messrs. Lindley have sewered Frankfort-on-the-Main, and out of 6,800 houses, 5,200 have been completely drained, and in the town there are about 22,000 water-closets. At present, the sewage goes into the River Main, but it is to be intercepted and clarified. The Prussian Government insists on sewage clarification, which at present is stopping sewerage on the Rhine cities, where it is very much needed.

The water of the Rhine is, however, used for domestic purposes by the populations on its banks, and it ought therefore to be preserved free from sewage.

French and Belgian towns remain with cesspools. Even Paris and Brussels, with their enormous and costly main intercepting-sewers, are cities of cesspools; and I do not know of a single well-drained city in Italy.

We are met here in this ancient city of Exeter to discuss sanitary science and preventive medicine, engineering and sanitary construction, meteorology and geology—to give information and to receive information on subjects which we consider to be of vital importance to each individual man, to each town, and to each nation; but when we read the current news-

paper literature of the day, we seem as men beating the air. Statesmen, European and British, pay very little attention to our subjects, but starve labour by conscription, impoverish populations by taxation, and, at enormous cost, provide the most refined and terrible weapons for human destruction. We are in the midst of a war furore, and sanitary works can have no solid and satisfactory progress under existing conditions. There is over the length and breadth of Europe a rampant military spirit: armies, armaments, ironclads, and 100-ton guns, attract most attention. The people are summoned from far to witness autumn manœuvres conducted by emperors, as if soldiers were the beginning and ending of human progress and civilisation. The Americans appear to be the only sane nation. The governments of the old world are drunk with military ambition.

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## ON HEALTH.

[*Presidential Address delivered at the Social Science Congress,  
Newcastle-upon-Tyne, 1870.*]

THE programme states that this Department considers the various questions relating to the Public Health, and collects statistical evidence of the relative healthiness of different localities, of different industrial occupations, and generally, of the influences of external circumstances in the production of health or disease.

The special questions named for discussion are:—

“What is the best method of disposing of sewage and excreta?

“What modifications are desirable in existing sanitary laws and administration?

“What legislative measures ought to be taken to prevent the adulteration of food, drink, and drugs?”

It will not be possible to discuss full details connected with public health questions in a popular address, as there is not the time necessary to perform such a task. The collection of statistical evidence is, however, of the first importance, and, fortunately for Great Britain and for the world, this is under the charge of men who are able, industrious, and competent workers. Registration of marriages, births, disease, and death, enables a student in sanitary science to compare the state of the Public Health, week-by-week, quarter-by-quarter, and year-by-year. But very much more information is required than any printed returns can show, before the simplest

practical sanitary problem can be reasonably solved. The Registrar-General's Returns are made up for "Registration Areas," which are not in all cases the best for the purpose; as some of these areas include towns, villages, and rural districts, where populations are living under widely varying conditions, which produce results, favourable in some cases and unfavourable in others. A small town has, for instance, been sewered, drained, and supplied with good water, cesspools and common privies having been abolished, such diseases as typhoid fever and diphtheria having ceased; but in the registration area bearing the name of such town, unimproved detached residences and villages having cesspools and polluted water are included, and diseases incident to these defective conditions prevail in these houses and villages, and are classed in the return as having occurred in the town district which has been improved; there may be also county hospitals, asylums, workhouses, and gaols, the deaths in which are registered as occurring in the town, though really due to the districts from whence they came. This is a double injury: it injures the town, and also misleads the outside public. The subject has, however, previously been noticed, and will probably soon be amended. The returns given for large towns are also imperfectly instructive. It is certainly very desirable to know how one great centre of population compares with another, as, for instance, London with Paris, Berlin with Vienna, Manchester with Leeds, Liverpool with Glasgow, and Edinburgh with Dublin; but the figures, 22.50 per 1000 for country districts, and 25.75 per 1000 for town districts—20 for London and 35 for Vienna, do not tell much of the sanitary story; as in each area there are divisions, subdivisions, and variations which, if fully stated, would simply be frightful. In that vast aggregation of humanity which we call London, and which we also complacently consider the healthiest

city in the world, in place of reading, "20 per 1000" as the "average" return, we should learn from the details that there are districts in which the mortality ranges from 50 up to 100 (and more) per 1000—in human dens of wretchedness, crime, and pauperism; the owners of property in such districts having no regard for sanitary improvement, but to avoid or to retard it, and to take the parish money paid in relief, as rent.

The term "preventible" has been applied by sanitarians to all deaths occurring from zymotic diseases. There are "preventible" deaths and "preventible cases of sickness" also, the latter being 20 times the greatest; that is, to produce one preventible death, there will have occurred 20 or more cases of preventible sickness of longer or shorter duration, and to this excessive "preventible sickness" may very fairly be attributable probably one-half of the poor-rate.

The conditions which affect public health are indeed various, complicated, and difficult to understand. Climate, seasons, excesses of heat, of moisture, and of cold; defective modes of shelter, lack of clothing, and excess of drinking, all influence the local public health.

Statistical evidence being obtainable—its proper use is the difficulty. Various writers, ancient and modern, have recorded the rise, course, and terrible effects of plague, pestilence, typhus-fever, and cholera; and we have a tolerably full library of books detailing the past ravages of black-death, sweating-sickness, and other mediæval diseases, as also of the existing typhus, diphtheria, small-pox, scarlatina, and cholera.

A series of Reports preceded the passing of the Public Health Act, 1848, elaborately detailing the sanitary condition of the population of England, the Report of 1842 being for completeness at the head of this class of literature. This Report embodies the labours of many observers and workers,

and may be said to have dissected modern society in England. Towns, we learn, were not sewered; houses, we also learn, were not drained; or we further learn that works of this character were so rude and imperfect as to be causes of nuisance and disease rather than promoters of health, the first principles of sanitary engineering not having then been worked out; villages and single houses in the country were also found to be in bad plight. This great "Report on the Sanitary Condition of the Labouring Population of Great Britain, with Appendices (1842)," and the "Supplementary Report on the Practice of Interment in Towns," by Edwin Chadwick, Esq., Barrister-at-Law (1843), set forth in an understandable form the sanitary evils of our period; and in the Session of 1848 the Public Health Act became law. The Irish famine-fever of 1846-47, the outbreak of cholera in 1849-50 and in subsequent years, gave an impetus to remedial sanitary works which has steadily progressed. The Russian war of 1854, and subsequent years, but especially the severe mortality in the British army in the Crimea during the autumn, winter, and spring of 1854-55 was set forth, through the thoughtful and wise intervention of Lord Shaftesbury, who induced the Government of the day to send a Sanitary Commission to work at the great hospitals on the Bosphorus and at the camps in the field. A Commission was also sent out at the same time to inquire into commissariat defects. The records of the work done and of the results accomplished are embodied in the Reports. Since this period based on the lines then laid down, Army Sanitary Commissions have been established in the various armies of Europe and of America.

The great mortality in the Crimea during December, January, and February, 1854-55, which amounted in some regiments at the front to 70 per cent. of the men encamped in these months, alarmed the Government. Climate, exposure,

and trench-duty were cited as the causes; the men, however, it was found had no suitable clothing nor rations; even commissioned officers wore their clothes until they swarmed with vermin; there was no fuel to make fires for cooking, and the rations served out consisted of raw coffee-berries, hard biscuit, salt pork and rum. The road from Balaclava to the front, in a limestone district, with thousands of tons of this rock washed from the mountain's sides ready and handy for use (during the first winter) was never touched, and the road was a quagmire. The small but commodious harbour of Balaclava was allowed to become, from one end to the other, a mass of floating animal and vegetable garbage, and the village and the camp were tainted with human and animal filth. The hospitals on the Bosphorus were frightfully overcrowded and under-ventilated, and both within and without they were as bad as dirt and neglect could make them. Miss Nightingale furnishes full details in "Notes on Matters affecting the Health, Efficiency, and Hospital Administration of the British Army, founded chiefly on the experiences of the late War, presented by request to the Secretary of State for War, 1858." The world has heard that Miss Nightingale went out with her lady companions to nurse the sick and wounded; but it is not so widely known that this self-imposed duty, important as the results have been only constitutes a fractional portion of the labours of this lady. In my opinion, the labours of all other workers in the cause of the health and comfort of the British soldier sink into insignificance when compared with the work she has accomplished from then down to this time. The result of this labour has been the appointment of Sanitary Commissions which have inquired into the condition of barracks and hospitals in Great Britain, at the Mediterranean stations, in India, and, in fact, wherever a British soldier is stationed on duty throughout the world. The re-



sults, so far, are greatly reduced rates of mortality in the army, both at home and abroad.

Recent reports from India detail the local causes of excessive disease in that climate. These causes were and are, filthy native huts, filthy villages, filthy cantonments, and filthy cities; as also filthy British soldiers' barracks, filthy hospitals, filthy prisons, and even filthy sanitary hill-stations. The low class natives of the plains of India are described as being habitually dirty, idle, and apathetic. The water-sources are in many instances abominations—the water in rivers, tanks, and wells, being contaminated by human and animal excreta, and even by putrifying carcasses of man and beast; drowning in tanks and wells being common, the bodies wasting as the water is drawn for use. On cleaning some of these tanks and wells deposits of human bones have been found and removed, which bones indicate the fact that all other portions of the carcasses had been dissolved in the water. Contamination of water-tanks and wells by washing, bathing, and infiltration of excreta and decaying animal and vegetable refuse is common over a wide area in India, so far as we know it.

The sanitary condition of populations is to be studied primarily in their dwellings. If human beings have no means of observing the decencies required by civilisation, it may reasonably be expected that the doctrines which inculcate purity of life, of thought, and of speech, will be a dead letter. This question of human habitations is, therefore, the greatest problem Sanitarians and Statesmen have to solve. Sewering, draining, water-supply, and scavenging, however necessary and useful, are only works of secondary importance.

So far as history illustrates or explains anything connected with the past condition of the masses of mankind, the story is one of utter State neglect in securing decent home-accommodation. In ancient

times the masses were slaves, or in some respects worse than slaves, as ownership imposed responsibility, but the free peasant has been for the most part utterly neglected, and left to house himself as he could. This has been true of the past, and is also true of the present, over a large surface of the inhabited portion of the world. It is true of country districts, it is also true of towns and of cities, however magnificent they may be in their outward appearance. To describe the mud and bog-cabins of Ireland, the boothie of Scotland, and the cottages of England, would be to depict nests of foul air, of serofula, of physical debility, and of moral impurity. The sanitary defects similar to those in the lower class dwellings of Great Britain exist in the lower class dwellings of every nation and people on the face of the earth. There are reports in abundance on English, Scotch, and Irish villages and towns, setting forth the defects in all their hideous details. Single rooms being occupied by the members of a large family; father, mother, brothers, sisters, male and female lodgers (sometimes pigs and dogs), mixed in one nest of impurity. Poverty is not always the cause, and, if it were so, should this continue to be a satisfactory excuse? Will sanitary reports describing these wretched abodes of the teeming populations, or will sanitary rules and recommendations, if left to chance enforcement, avail if the work of the State stops with reporting and recommending? May not its action under such conditions be termed "a delusion and a snare?"

Poverty is recognised by the Poor Law, and property is made to bear the pecuniary burden; sickness is recognised by private charity, hence the various forms of endowments, as also the building and support of public hospitals, whereby charity is made fashionable. Crime is provided for in gaols and in the maintenance of legal tribunals, punishment consequently becomes the work and cost of the State. These arrangements are, at this moment, the

national measure of civilisation in England. Sanitary legislation, it is true, commenced in 1848, and Act upon Act has since been piled up, one to mend the other, until confusion is the result. Men "learned in the law" cannot even understand and of course cannot interpret these Acts.

A Royal Commission under the chairmanship of Sir Charles B. Adderley, M.P., has been taking evidence relative to sanitary laws, and is expected to make a report, with recommendations, in time for the Legislature in 1871. Whether Parliament will provide any practical remedy for improving human dwellings generally remains to be seen. Poverty of the occupant is a plea which may be put forth by the peasant in the country, and also by the labourer in the town, and which cannot be gainsaid. The unaided poor cannot provide their places of residence, but must exist in such as they find; the poverty of the individual is, therefore, an effectual bar to improvement by him—he must take his health and his morals as provided for him by others. If born with an unsound constitution, Poor Law taxation may have to keep him. If example inculcates crime, he will oscillate in and out of gaol. The worst of the males learn crime and live by it. The most tempted of the female portion of such families drift into prostitution. The wealth of the State is not saved by this mal-arrangement; a fact which has been explained and proved over and over again.

Defective house-accommodation tends to produce disease, immorality, pauperism, and crime, from generation to generation, until vice becomes a second nature, and morality, virtue, truth, and honesty are, to human beings so debased, mere names. The money expended in relieving pauperism, in detecting and in punishing crime, and in supporting the sick, if properly expended, would provide sufficient funds to furnish improved house-accommodation. Taking floor areas and cubic space into account, and the

money expended within such spaces, it will be found that wretched dens of misery and vice are more costly to the community than any equal area and cubic space in a palace. There are tenements by hundreds of thousands which generate sickness, pauperism, and crime, the cost of which is paid for out of rates, and yet such property is not worth more than from three to five years' purchase, but the round of degradation is allowed to go on. Zymotic diseases cut down the head of a family. Typhus removes a father in the prime of life, and the family is then left to the care of the parish. "Once a pauper, always a pauper," has become a proverb. Statesmen have, therefore, this lesson to learn, namely, that that which is necessary to the well-being of society, and which individuals cannot provide, but which States can cause to be provided, must be the bounden duty of the State to see furnished. No excuse can be valid.

It does not follow, as an inference from these arguments, that States must build and own cottage tenements, but it may be inferred that States ought to frame laws and provide means and machinery for enforcing such laws and regulations as are necessary to bring about the required improvements. State aid has been given and is afforded in many forms, but upon no defined or settled principles applicable to the full requirements of the empire. There are Exchequer Loan Commissioners, who, however, are only State hybrids—they are not wholly a Government department, neither are they independent, but being in connection with the Chancellor of the Exchequer, they can advance State money on loans for various purposes. Parliament also by fits and starts votes money on loans for purposes outside strictly Government requirements—as to relieve the Irish Famine, 1846-47; to drain agricultural land; to promote special occupations, as fisheries; to construct roads, canals, harbours, and river improvements; and to provide for the execution of sanitary



works, as in Lancashire during the cotton famine. Corporations and local boards can also borrow money from Government for main-sewering, for waterworks, and for general improvements; but not on any simple, easy, and equitable principle, as the rates of interest charged vary from 3 per cent. to 5 per cent. Exchequer loans are also as a rule discouraged.\*

The question may be asked—Should the State halt on the threshold of so wise an arrangement as lending money to aid sanitary improvements? The money (£1,850,000.) lent to the distressed cotton districts (1863-69), under the supervision of the Right Honourable C. P. Villiers, M.P., President of the Poor Law Board, has been expended on works of a permanent and sanitary character, such as main-sewers, house-drains, forming streets and roads, constructing waterworks, and other works of local improvement, thereby securing to the inhabitants means to enjoy better health, more comfort, and greater facilities for locomotion and trade. The advance of this money relieved local distress at no cost to the State, because the local rates are mortgaged as security, and both the principal and interest (at  $3\frac{1}{2}$  per cent.) is being paid and will be repaid to the uttermost farthing, within a period not exceeding thirty years. If Government would lend money, at this rate of interest, and provide legal power to enable Parish Authorities, Town Councils, Local Boards, and other similar Public Bodies, to abolish disease-producing slums, and to build or see built improved dwelling-houses, to sewer, drain, construct waterworks, markets, &c., and to effect street, road, and other town improvements, the progress of the whole country in sanitary improvements would be rapid, and the Registrar-General would soon be enabled to record the beneficial results in his returns;

\* Since this was written, additional facilities for advancing money for various purposes have been provided, and the Public Health Act has been amended.



pauperism would lessen its alarming growth, and crime would be reduced.

The State, under outside pressure, has recently done something in the way of facilitating the improvement of workmen's dwellings—as by passing an Act to enable the Exchequer Loan Commissioners to advance money on loan (at  $3\frac{1}{2}$  per cent.) to assist limited liability companies formed for the erection of industrial workmen's dwellings—such loans to be in aid or extension of capital subscribed and paid up. Sir Sidney Waterlow's Company, in London, has obtained money so provided, for the purpose of erecting improved dwellings. Mr. McCullagh Torrens, M.P. for Finsbury, has also obtained an Act to enable local authorities, on the certificate of a sanitary officer, to compel, summarily the improvement or removal of house and other property certified to be unfit for human habitation; and there are several independent associations of benevolent men in London, in Leeds, in Hastings, and in other towns, who undertake the purchasing of house property notoriously bad (as Wild's Court, London), for the purpose of improving the same, and great moral and sanitary improvement has thus been and is being accomplished. Lord Shaftesbury, by the Common Lodging-houses Registration and Inspection Act, has effected much good. The benefits conferred by this Act are so much appreciated that even the tramps assist to enforce the rules as to cubic space, clean bedding and ventilation. In Liverpool the Corporation has obtained power to purchase overerowed cottage property, and to remove so much of the same as may be considered necessary to secure an improved state of public health. This work is going on. Sunderland has obtained similar Parliamentary powers, and is proceeding, or is about to proceed, to pull down some of the most defective house-property in that borough. The late Mr. Peabody's large bequest of £500,000 for the improvement and erection of industrial dwellings, by a judicious investment

of the growing net revenue of the fund ought, in the next fifty years, to go far towards providing industrial dwellings of the best character for the artisans and others requiring house-accommodation in London. There are in all parts of the kingdom charity funds to a very large amount, left by former benefactors for many purposes which have become obsolete or even mischievous, which the Charity Commissioners might be empowered to reappropriate to more useful purposes, especially in the direction of providing improved cottage-dwellings.

We now want a report or treatise, of an exact and statistical character, setting forth with clearness and precision the financial, sanitary, and moral results of the more important industrial dwellings undertakings in this country of the last fifteen years. Financial, in order to bring to a practical test of profit and loss, expenditure undertaken in different parts of the country under ordinary or peculiar conditions;—sanitary, in order to show that improved house-accommodation means less sickness, less mortality, healthier children, and higher wage-earning power;—moral, in order to show that Better Dwellings mean more sober habits, accumulated savings, and fewer offences against the law.

The first steps in sanitary progress are, as previously indicated, special examinations and faithful reports; and then remedial measures ought to follow. The inspections and reports in England have to some extent been followed by works, and at the present time the Local Government Act 1858 has been adopted in some 700 places, and the number is being added to. A sum of about £8,000,000 sterling (exclusive of the metropolis) has been expended on the various works provided for by the powers of that Act, such as sewerage, draining, water supply, road and street improvements, &c.\* To put

\* This 8,000,000 represents the PUBLIC DEBT; but as private improvements are paid for by owners and occupiers,

the whole of England in a similar sanitary state will cost about £50,000,000 in addition. In round numbers, from £2 to £5 sterling per head of the population may have been expended under the Act. Large as these figures appear, when thus stated, the expenditure has been and will be a relief and not a burden. House-property has been and will be increased in value, and in so far as causes producing zymotic diseases are removed, the ratepayers enjoy better health, earn fuller wages, and are consequently better enabled to pay the rents demanded. There are many persons, however, who do not appear to value health, if providing the means to obtain it touch their pockets. These persons in towns and villages are, small shop-keepers in business or retired, small speculative builders, and owners of cottage-property, generally owners of cottages of the worst class, which, on account of their badness, are relieved from paying rates, but in which fever and pauperism are manufactured with singular regularity, the parish relieving-officer indirectly, but nevertheless regularly, paying the rents.

Since the Crimean war and the effective work of the first Army Sanitary Commission, there have been commissions, inquiries, and reports, as to barracks and hospitals on home stations, and works of sewerage, drainage, water-supply, and of ventilation have been carried out, the results being a great reduction in the sick-rate, and a reduced annual army death-rate of about 8 in each 1,000. The Mediterranean stations have been examined, the water-supply of Malta has been improved, whilst plans and estimates for main-sewering and draining are ready, waiting to be adopted and carried out. Gibraltar has been sewered, drained, and furnished with an improved supply of water. India is now the seat of

and as a rule the private expenses of drains, closets, cisterns, pipes, and apparatus, cost about as much as the public works, the expenditure on sanitary works and apparatus has been not less than £16,000,000.

a vast sanitary movement, reports having been ordered and sent in. To extract only fragmental portions of these reports would occupy more space to write and time to read than are allowable in an address. Calcutta being the capital of British India, is, however, thus described, which gives some idea of the sad condition of India:

“It is beyond contradiction that the present condition of Calcutta (1868) is highly unsatisfactory, and is a reasonable cause of alarm to the sanitarian. I write advisedly when I assert that, for flagrant nuisances, stagnation of filth, vast accumulations of excremental matter, vegetable and animal decay and putridity, foul effluvia from open drains, sickening odours generally, sewage-contamination of air, water, and soil, impurity of drinking-water, horrible defilements of every sort, inefficient scavenging, want of proper drainage, and general sanitary mal-administration, Calcutta will compete with any other city at home or abroad.”\*

India is described in the Sanitary Reports recently sent to England as one vast field of general uncleanness, and consequently the ravages or disease and death are excessive. The delta of the Ganges in all its seats of human habitation is a vast area of filth of every type to be found where sanitary regulations have been from the remotest periods utterly neglected. The sacred river, in the monsoon periods, brings down the tropical rains and inundates large areas, drowning out disease for the time. The waters subside, the fierce sun dries up the swamps, putrescence begins, and fevers with cholera again reign, quickening the germs of disease to be matured as seasons favour the process. Cholera need not be any longer considered a mystery, as this disease obeys well-ascertained laws. Its birth is in the midst of indescribable human filth, which is removable; its spread is along lines of human communication where filth abounds, irrespec-

\* David B. Smith, M.D., Sanitary Commissioner for Bengal.



tive of all other terrestrial or meteorological considerations; there must, however, be human populations to generate cholera. The course of rivers, stratifications, and even elevation, have apparently little influence, as, given a population grovelling amidst filth, and there may be cholera from the tropics to the poles.\* New countries were said to be free from old world diseases; but, alas! this has been only for a time. Zymotic diseases, at first unknown, are now rife in the Australian towns since population and dirt have increased; like causes producing like results.

The sanitary condition of a State is visible to the eye of a stranger and student, in the bodies, features, and rags of its population. The dirty, half-naked, stunted, squalid, diseased, and crippled mendicants, of any country, as well as the ragged, able-bodied, and bold beggars, declare the results of defective legislative provisions and sanitary regulations. The street-arabs and tramps of London, the English paupers, the ragged and turbulent peasants of Ireland, the barefooted women and children of Scotland, all show that vast masses of the populations of Great Britain and Ireland are in all things good, uncared-for, and consequently degeneracy is most painfully visible. The filth-diseased human face and form present hideous squalor and distortion—and usually as is the body so is the mind. Such populations are a disgrace to their country, an incumbrance to the community, a money loss to the State, and a civil terror to the orderly.

Sanitary works may be simple in country districts, but in towns they become compound and, therefore, complex. Municipal, parochial, and personal care and labour are, however, required under all conditions, and this fact has not as yet been

\* Cholera has been said to prevail in excess on certain geological strata and to avoid regions of granite—to follow the course of rivers—to be most deadly on low sites; but where populations are massed for purposes of commerce, and live in neglect of sanitary laws, there cholera may prevail in excess on any strata or on any occupied site.



generally appreciated and acted upon ; hence arises, from personal, municipal, and parochial neglect, much of the nuisance wrongly imputed to sanitary appliances.

The physician and the sanitary engineer must also, as a first lesson, learn the simple laws of nature, that they may know their weakness, as also in what may consist their power, as the grand phenomena of nature can only be partially controlled.

The atmosphere is the breath of life, but a contaminated atmosphere produces sickness and premature death. Temperature, dryness, and moisture, affect health ; and it will be wisdom to understand how far these conditions are beyond the control of man, as also to what extent he may modify them.

The sun is the source of heat, and this heat is dispersed through space, year-by-year and age-by-age. It is, however, suspected that some annual variation can be observed in the annual volume and effects of the heat of the sun in the earth's atmosphere.\* The salt ocean is the source of vapour, and the annual volume of aqueous vapour raised into the atmosphere will necessarily be in proportion to the heating power of the rays from the sun ; and as the moisture will be in proportion to the heat and water evaporated, so also will be the precipitation of moisture in the form of snow, hail, dew, and rain. Temperature and moisture affect the public health seriously in several ways : vegetation is affected, through vegetation animal life, through animal life man. A series of exceptionally dry seasons produce famine ; a series of wet seasons produce blight in vegetation, murrain in cattle, and then wide-spread epidemics in man. History furnishes the details, though historians do

\* In meteorology, seasons vary, in the fall of rain, about as 1 to 2, that is, if a dry season gives 20 inches of rain in a year, a wet season will give 40 inches, ; and an average of years will give 30 inches. Does the heat of the sun vary so as to produce this meteorological variation in the fall of rain?

not in all cases recognise their importance. Science is young, but vast advances have been made in the study of meteorology, and the aids now afforded will enable students to discard ancient fallacies and establish new truths; local tables of weather predictions in detail will become obsolete; forecasts for continents and islands will become common. The electric telegraph will be the warner and teacher of the meteorologist, as by its aid he will have note of the tornado at its birth, and by experience indicate its probable course; then "to be forewarned will be to be forearmed."

Commerce under free trade can save from famine, and sanitary science can mitigate the severity of epidemics. Man cannot, however, regulate cosmical changes, nor will any work of man more than fractionally modify cosmical effects; continents and islands, parts of continents and parts of islands, will continue to have seasons of heat, of drought, or of deluging rain, irrespective of the drainage of land or its cultivation.\* A few facts will illustrate this. In the year 1864 the continent of Europe suffered drought; Australia was flooded by successive falls of rain. In 1866 Australia experienced a fatal drought; Europe suffered from excess of rain. This year (1870) great drought again prevails in portions of the northern hemisphere, and Australia is again deluged with rain, that is, there is more than the average of drought and of rain alternating. There are not, however, entire seasons over the surface of the world, either of drought or of rain. At what point heat and moisture are friends or foes physicians must study; a few degrees more of heat in summer, or of cold in

\* Forests affect meteorology only over their own local areas, to the extent of several degrees of temperature. Land-draining and cultivation also affect local temperature only, and that during ordinary periods; but these neither lessen nor increase the excesses of nature in her storms or in her calms.

winter, affect the Registrar-General's returns, both of sickness and of death.

Meteorology also affects water-supply. The heat of the sun causes evaporation from the ocean, and the vapour is condensed into pure-water (soft-water). There is no other source of pure, soft, and fresh-water but the salt ocean. All fresh-water found in springs, rivulets, streams, rivers, and lakes, or in the substrata of the earth's crust, has therefore been evaporated from the salt ocean, and after permeating the subsoil, or flowing over the surface, wends back to the great ocean-reservoir of the world, again to be salted, purified, and re-evaporated, to be once more floated in the air to the virgin springs and streams of the earth.

Public water-supply has been greatly extended within the last quarter of a century, both at home and abroad. The metropolis obtains its 150,000,000 gallons per day, partly from the River Thames, partly from the River Lee, and partly from wells sunk in chalk and from beds of gravel on the margins of the Thames; the river sources are, however, polluted by washings from manured lands, roads, villages, and towns, such washings containing polluting matter. Bathing is common to both rivers, which is prohibited in impounding reservoirs for town supplies. Liverpool, Manchester, Bradford, and other towns, have obtained soft and comparatively pure water from mountain water-sheds; and works are in progress for Leeds, Huddersfield, and some other places. Glasgow has Loch Katrine water in abundance, Dublin that from the Vartry, both sources producing water soft and comparatively pure. A few instances may be named of waterworks in different parts of the world. In America, New York has the Croton and Brooklyn waters, and Chicago takes water by a tunnel driven under the shore-bed of Lake Michigan. In India, Calcutta is completing a scheme for taking water from the River Hooghly, a branch of the Ganges—Bombay has the Vehar reservoir; and in China, Hong-Kong is having an impounding reservoir constructed at Poketoolum to

supply that station with water from the surface of the granite. This information is general and brief, serving however to indicate some progress both at home and abroad, but the work done leaves a wide margin untouched, sufficient in importance to demand the attention of the highest ruling authorities, and it is only by repeatedly directing attention to the destitution of the populations that progress can be facilitated.

Sanitary science, before it can be of practical use, must be learned by statesmen, as the strength of a nation is in its health, and where there is the healthiest community, there bodily purity and morality will have the greatest development. Empires, Monarchies, and Republics have this lesson to learn.

In the cities of the Republican States of North America, the worst sanitary defects of the worst cities of Europe are being repeated.

The aim and end of statesmanship ought to be to ensure to every individual born into the State means of health and of morality. Each Englishman's home should not only be his castle, but his hospital, charity will not then degrade but will elevate; and that alone will be true charity which assists the poor to assist themselves, and so to live independent of almsbegging and almsgiving.

The sanitary engineer and manufacturer of the future should know nothing of waste products, because sewage should be used as a valuable manure, and the refuse ingredients which now pollute and destroy our rivers should be converted to profitable uses. Smoke may be prevented and noxious fumes may be condensed.

The Statesman of the future will make social questions his study and care, and whilst providing for defence and taxation, he will see that measures necessary to the prevention of disease and mortality in excess shall also be provided and administered; and if the foul dwellings in country and towns are removed—wholesome cottages and tenements substituted—waste products of manufactures and populations utilized—health and morals will be improved, and much money will be saved.



[*Editorial remarks on the preceding Paper, from the "Newcastle Daily Chronicle," Tuesday, September 27th, 1870.*]

MR. RAWLINSON ON PUBLIC HEALTH.

ANYONE who has circulated, in an aimless and impartial way, through the several sections of the Congress now sitting in Newcastle will have been occasionally bewildered by observing that each topic has been discussed as if it were undoubtedly of much higher importance than any other submitted to the members. Such an impression is incidental, however, to the arrangement which breaks up the subject-matter of social science into specific inquiries, and it deserves to be regarded as a proof that the arrangement is a wise one.

It is plain that the field under cultivation by the Association is a very wide one, and yet that it is one field, that no part of this field will be made the best of until the whole acreage has been effectively brought under tillage, and that the surest way of accomplishing the whole of the desired result is the allotment of separate portions to gangs of enthusiastic and specially-qualified workmen, who will resort to intellectual spade-labour in order that their respective portions may be thoroughly well wrought. This is exactly what has been done; and the result, so far as it can be apprehended by the unbiassed and perhaps not very philosophical mind of the average public, is that the sectional discussions have been extensively characterised by hobby-riding. When that result is nearer to maturity than it now is, there will appear to all, as even now there is visible to the more reflective portion of the community, a real unity of purpose and action, and that hobby-riding, when under efficient control, is not the worst way of reaching a winning-post safe and soon.

The truth is that society is a complicated phenomenon, and the reforms suggested by its present condition, like the evils which disorder and afflict it, are at once closely related and infinitely varied. Thoughtlessness, ignorance, and selfishness are the sources of all the social maladies which still defy the zeal of philanthropy and the sagacity of states-



manship. Reform must proceed upon the general, if not universal conviction that we are one body though many members, so that if one suffers, all suffer more or less. In this way even selfishness is utilized, and looks as if it were the mother of all the virtues; but in order to imbue the public mind with this doctrine of independence it must be shown that all the evils of society are indefinitely epidemic, and moreover that if they are engendered by active disobedience to the laws of the universe they are fostered into pests by the apathy of those who are themselves, to some extent, conformed, in their manner of life, to correct principles and ascertained natural laws. And lastly, the attention of those in whom it is of the highest importance to beget the habit of thoughtfulness for others, must be authoritatively directed not only to the mischief which is at work, but also to its causes, and to the consideration of methods for their removal. This can only be done by the presentation of illustrative facts, and it may be done with speedier effect if the correlation of these facts be argued out for them in such a way as to be nearly self-evident.

This is the scope of the work which the Congress has set itself to accomplish; and when its labours are studied from an elevated standpoint, it is seen that each department contributes its quota to the enlightening, convincing, and utilising of public opinion. The whole is seen first in its many parts, and then the many parts are seen as one beautiful whole. For a moment it may seem as if mental education was of exceptional moment; then bodily training and all the affiliated subdivisions of the health question press their claims one after the other most jealously on public attention; then matters of social economy, affecting the means of livelihood and the rights of property or of labour, stand out in large proportions, as if to dwarf all cognate topics; and again, at such a time as the present, when war is laying waste one of the fairest and happiest countries of the earth, international relationships appear to be invested with paramount importance. By-and-by it will be seen that education comprises body as well as mind, and social economy embraces health and education as well as wages, hours of labour, co-operation, criminal discipline, the general position of woman, and the treatment of castaways.

It is not surprising, then, that a practical philosopher like Mr. RAWLINSON should feel himself impelled to import into his essay on sanitarian science certain matters which cannot be said to have a very obvious, though he shows them to have a very real, bearing on the physical condition

of the people; still less is it surprising that one who has thought, said, and done so much in behalf of the public health should highly exalt the value of the department over which he presides. The truth is, that health, education, trade, and law are co-ordinate and mutually subservient branches of the one great subject of social reform. He who labours philosophically in one of these subjects is perhaps doing more for the general welfare of his kind when allowing himself to be absorbed in his topic, and seeking to absorb everything within his reach to the business of illustrating and enforcing his views, than if he were to launch out in a vague crusade against a whole batch of social pests, and to dissipate, over a wide surface of generalities, the energy he is now concentrating on a speciality. Mr. RAWLINSON has in hand a set of principles which have already attained to the dignity of axioms, and therefore his main business is to hammer and drum them into the public mind with all the logic, rhetoric, and statistics that he can muster. After two-and-twenty years of such hammering and drumming, not one-sixth of the necessary work has been done, and it behoves him to continue the process with unflagging determination.

According to the view taken of his subject by Mr. RAWLINSON, health is not so much a primary as an all-pervading condition of social well-being. That health is in a general way essential to all forms of enjoyment and to the right discharge of all duties is almost a truism; but it is only by the help of such an analysis as is given in his address that the majority of persons will be able to understand how true the truism is. Take for example the questions of dwellings and of the disposal of sewage, which are the cardinal points of this discourse, and it will be seen how, as from a double centre, all sorts of influence radiate which at present are baneful, but which by the application of science and the enforcement of the law may be converted into beneficent streams. "This question of human habitations," he insists, "is the greatest problem which sanitarians and statesmen have to solve. Sewering, draining, and scavenging are works of secondary importance." An honest description of the wretched hovels assigned to peasants in many parts of England and Scotland, as well as in Ireland, would be, he maintains, a portraiture of "nests of foul air, of scrofula, of physical debility, and of moral impurity." Whole families, and sometimes more than one family, are herded together in single rooms, so that the waste of animal life, which, in the progress of its return to

an elementary condition, is rank poison to the life of which it is the offscouring, defiles every breath of air, and generates physical depression, a consequent craving for artificial stimulants, chronic fever, muscular debility, nervous distress, moral indifference, intellectual stupor, with ever-recurring outbreaks of zymotic pestilence, crazed passion and unappeasable desperation. That poverty is not the sole explanation of this sad state of things is evident from two considerations. The town worker with far higher wages is often no better off than the rustic; and on the other hand, both in town and country there are numerous exceptions for which a difference in wages-earning fails to account. And that poverty, if it were the sole cause, ought not to be held as a sufficient excuse is equally plain when it is borne in mind that poverty itself is recognised as a claim for State interference, and even crime is most abundantly looked after by the Legislature. The occupants of these miserable abodes are generally poor enough to escape all responsibility, though they are the first, and occasionally the only ones, to suffer. But the State is not poor, the parish is not poor, the town is not poor, the community is not so poor or so powerless as that it lacks money and authority to remedy this disgraceful state of things.

Such being the case, and precedent being by no means wanting, it becomes the State to take the matter in hand, and to carry it through with a high hand by means of loans, which, on a double security of rates and rents, would be safe for repayment by instalments without any extraordinary pressure on the community. At first this would involve additional burdens; but long before the period for repayment arrived, the immenso improvement in the health and working-power and moral vigour of the people would render the total of taxation less in bulk, and the means of paying taxes much greater. Poor-rates, gaol-rates, infirmary and dispensary expenditure would all be materially reduced; and an invigorated population would not feel such burdens as remained. The deterioration of a man as a worker, a learner, and a citizen, as well as the degradation of woman, and the destruction of offspring would be powerfully arrested. The mind, emancipated from irritating burdens of ailment, would then begin to live and rule and rejoice. The purity of womanhood, which up to a certain point Nature herself so jealously guards, would abide uncorrupted to the end. Life would be a blessing to its possessor instead of a weary curse, and serenity would take the place of indifference or despair. And, as with the first, so also with the

second of the points we have selected. The blessings of a change would be positive as well as negative. These blessings Mr. RAWLINSON sums up in a single sentence. He says, "the sanitary engineer of the future will know nothing of 'refuse matter' other than as a useful product, which, properly applied to the soil, will add to the wealth of the community." That he may come to regard it in this light, it is necessary first of all that he should get it under his regard, and when he has got it, he should be able to distribute it in an available form. This involves the engineering of sewer-making and the chemistry of waste. At present, the rule appears to be to construct elaborate systems, at enormous expense, for the mere purpose of carrying the waste where no chemistry can get at it to any purpose; and, unhappily, when it is put where no use can be made of it, it is a source of injury almost as great as if no attempt had been made to get rid of it at all. It pollutes the air directly through a thousand untrapped gullies, and defies even a trap to coerce it; and then it passes on to corrupt the streams that were meant to refresh and gladden the heart of humanity. Perhaps the first thing wanted is a clear understanding of what the chemist can do with it when he gets it. That once settled, it ought not to be a very difficult matter in any case, but in such a town as Newcastle it would be very easy to devise an effective system of collection and deportation. So far there seems to have been but halting progress made towards a satisfactory issue on either point in any single instance. Still it is preposterous to suppose that European science can be really baffled where Chinese mother-wit has so largely succeeded; and it should not be regarded as visionary when hopeful *savants* speak of a time when the land shall be enriched and made most beautiful by that which came from it at the first, and which never rests from mischief when once liberated from its task until it finds its grave where it once found a cradle. With wholesome dwellings and usefully applied sewage, the community will one day have abundant reason to marvel that their predecessors in the occupancy of the earth so little understood the worth and wisdom of the universe of which they formed a part.

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WORKING-MEN'S MEETING  
IN THE  
TOWN-HALL, NEWCASTLE-UPON-TYNE,  
SATURDAY, SEPTEMBER 24TH, 1870.

Mr. RAWLINSON, C.B. (President of the Health Section) was next called upon, and said: I suppose I am called upon to address this vast assembly of working men because I can claim the privilege of having sprung from the same stock as the men I see before me—(hear, hear)—and I imagine that from my past knowledge and experience I may, in the limited time afforded to me, be enabled to say something of use—something of advice—probably something of warning, and also something of encouragement. I am old enough to remember working men for 50 years, as it is about 50 years since my acquaintance first began with the working men of this country. I don't know that I am competent at this moment to judge with accuracy of the feelings and the conditions of the vast mass of the working men I see before me, but it may probably both instruct you, and in some respects amuse you, if I tell you what was attempted to be inculcated into my mind when I was a youth of ten years of age. It was, as far as my experience went, the common conversation among working men then, that the cleverest man was a good drinker—a good fuddler. (Laughter.) All operations connected with the building trade at that time were connected with drink



and degradation. When the foundation-stone was laid, it was celebrated by drinking; when the first floor was put on it was celebrated by drinking; when the roof-tree was reared, there was another bout of drinking. If a workman removed from one place to another he must pay his footing, and there was a celebration by drinking. Now, I sincerely hope that such customs are of the past, and not of the present. (Cheers.) But they were of the present in my day and generation, and if practice and precept could have made me a drunken man, I should have been dead long ago of drinking and sottishness. But something in my nature rebelled against it. I don't take credit to myself that I resisted, because I believe that I was constitutionally unfitted to be a drunkard, for if I was tempted into any excess of an evening, I paid the fearful penalty of a sick headache next morning. (Laughter.) You have been told that it is necessary to the prosperity of the working man that he should be educated. I tell you so too. My friend Professor Lyon Playfair has described to you the process the State is about to adopt to give to all your children means of a better education, and let me appeal to you as fathers of families—and I am exceedingly sorry that when you came here to-night you did not bring your wives with you, because I think it is just as necessary that the wife should hear all these arguments as it is that the husband should hear them. (Applause.) If a man has to hold his position in the world, and especially to raise himself in the world, he must do it with the assistance of that helpmeet that God has given him, who must live with him, work with him, strive with him, from the beginning to the end. (Applause.) Of what avail will your schools be—of what avail will all this teaching be, if it stops when the school-door is shut?—if you don't in your own homes follow out that education given to you in the school, and perseveringly strive to make more of it—if you don't take the talent entrusted to you, and so work it that the five

talents shall be ten talents, and that at the end of life the Great Master may say to you, "Well done, good and faithful servant, enter into thy reward." (Cheers.) Every working-man's home, as Mr. Godwin has told you, should be so improved that it can be his comfortable residence—his castle, and in time of sickness his hospital. I don't think it is a creditable state of things that charity should so supplement that condition of the working-man, that when sickness overtakes him he is necessarily put with an aggregation of human beings in the same state of misery. (Hear, hear.) When civilisation has fulfilled its mission, and when Statesmen have learned the full lesson of their duty, and when Governments so regulate and so order the laws, I hope that if we don't see it, our children or children's children will see it—that every man can have a roof over him; can have room-space about him and comforts within himself; and that he may not then need to go externally either to the dramshop or the beershop to get out of the close and dirty court in which he has to dwell, or on washing days to get rid of the smell of the soap-suds—(laughter and cheers)—to spend his earnings selfishly and improperly in debasing himself, degrading his wife, and beggaring his children.

In a remarkable speech made by that great statesman, philanthropist, and speaker, John Bright, at Birmingham—(loud cheers)—he used this grand simile—he said that when the Atlantic telegraph cable was lost in mid-ocean—thought to be hopelessly lost, the iron grappling hand of science was lowered 2,000 fathoms deep, successfully grappled the cable, and brought up the line of communication which bound two worlds in one. He then further said that he thought it was time to consider if the human hand of statesmanship could not be lowered down to the depths of our civil degradation and grapple with the misery and destitution that pervaded the working world. I sincerely hope that this society's meetings

will enable us to come to right conclusions, and also enable us to advise the legislature to enact wise laws—for that is at the bottom of it all—that you individually, each man for himself, shall study the question, and strive how much better he can make himself, how much more comfortable he can make his home, and how much happier he can make his wife and children. (Loud cheers.)

## ROBERT RAWLINSON, C.E., C.B.

*[The following brief biographical notice appeared in a local newspaper at the time of the meeting.]*

ONLY within the limits of the present generation have great questions respecting the sanitary condition of great cities and towns being adequately considered and disenssed. For ages a rude and dangerous system has prevailed, and nations have paid the penalty in the loss of life and strength among the flower of the people. Fortunately, the time has come when the conscience, and perhaps also the selfishness of communities have been aroused, and determined efforts have been put forth to remedy hoary and destructive evils. Quite a new order of civil engineers has arisen, who have studied the science of their profession from a new standpoint, and have enabled it to be a noble instrument for the improvement of the condition of the people. Inquiries have been started as to sewerage, drainage, water-supply, the mode of erecting dwellings, methods of ventilation, heat, construction, and other kindred topics, which have resulted most beneficially upon the health and vitality of the nations. A spirit of enthusiasm has been enkindled among engineers, and they have lifted their profession from a mere mechanical drudgery into the very noblest regions of science and philanthropy.

Conspicuous by energy, capability, and devotion to the enobling work of the profession, stands the President of the Health Department of the Congress, Robert Rawlinson, C.E., C.B. Mr. Rawlinson is one of those great men who have sprung from the ranks of the people. He has lived a most active and useful life, consecrated to the absorbing duties of his profession. One of the most active of engineers, he has made a name for himself for the boldness of his plans, the soundness of his principles, and the determination with which he has faced and overcome embattled hosts of difficulties.

His reports to the Board of Health respecting the condition of many large towns, and the strictures he has felt it his duty to make upon the plans put into operation by various Corporations—Newcastle, to wit—have at times

brought upon him severe criticisms and unmeasured rebukes. But knowing he was animated only by the desire to promote the true welfare of the people, he has not been much disconcerted by attacks made upon himself. This part of the country has had no small share of the attention of Mr. Rawlinson, for he has had to report on various matters respecting Gateshead, Alnwick, Hexham, Tynemouth, Morpeth, Carlisle, Penrith, &c. He has lately drawn attention to the defective sanitary state of Newcastle, and thus roused the ire of some of the local magnates. Doubtless these champions of our local works will be present in the Health Department of the Congress to break a lance with the chivalrous president, who, after throwing down his gauntlet, has ventured in friendly boldness to accept the position offered to him by the Congress executive. He comes to this great meeting—as he has gone elsewhere—to excite a spirit of inquiry, and to rouse communities to a sense of their duty and responsibility.

To Mr. Rawlinson the country is mainly indebted for that useful legislation which has enabled townships to form Local Boards of Health, with full powers to deal with lighting, sewerage, paving, water-supply, and other sanitary measures. At first these powers were looked on with great jealousy, and a most furious opposition was roused, but after the energetic community at Blaydon—the first place to put the Act into operation—had fought the battle, and demonstrated the usefulness and practical value of the measure, other places in this district and throughout the country speedily began to take advantage of it. Certainly it would not be affirming more than is demonstrably true to-day, that this wise legislation has done an immeasurable amount of good in improving the health of hundreds of districts, and uplifting the moral and social condition of the people. Mr. Rawlinson's services in this matter are worthy of the greatest commendation.

Mr. Rawlinson was one of the Commissioners sent out by this country to inquire into the causes of the terrible sickness and mortality among our soldiers in the Crimea, who were falling from preventible diseases more rapidly than by the Russian sword and bullet. In this capacity he is known to have shown great sagacity and intelligence, and to have rendered great service to the nation.

It may seem to some that a career of business energy and activity, like Mr. Rawlinson's, crowned with so much practical and solid success, is not enough in itself to merit the reception of honours from the Government and the



applause of the nation. But when it is remembered that all this success has only been in proportion to the amount of public good which he has done, and that every substantial gain to himself has been a thousandfold multiplied in benefits to the community, it will be universally felt that the nation which honours private enterprise and public services like Mr. Rawlinson's, honours itself by its appreciation of efforts which are made for the public good.

Despite his criticisms upon ourselves, no man will deserve, and no man will receive, a warmer welcome into this community than the President of the Health Department, and it is to be hoped that his presence and spirit will infuse new energy into the sanitary reformers of this district, and encourage them to the mere earnest and successful prosecution of their work.













